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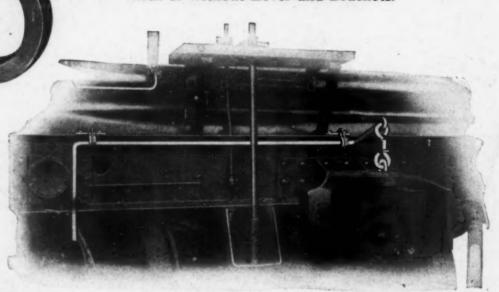
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# "The Revival of Railroad Development"

WHEN THE Railway Age published an editorial under the above heading in its Annual Statistical Number one year ago it was largely prophetic. The revival of railroad development was then prospective. It is now a reality. In the year 1922 capital expenditures of the Class I roads for new lines and extensions and for additions and betterments aggregated \$468,000,000. When deductions for property retired and other adjustments had been made the net investment for the year was found to be \$302,000,000. Total capital expenditures in 1923 are estimated at almost \$1,100,000,000. The amount of equipment retired during the year was large. When, however, allowance has been made for property retired it probably will be found that the net increase in investment in road and equipment during the year was around \$900,000,000.

The significance of this figure will be best appreciated when it is compared with corresponding statistics for earlier years. In the nine and a half years ending with 1921 the average annual new investment in road and equipment of all the railways (excluding switching and terminal companies) was \$456,000,000. The largest investment reported in any single year of this period was in 1917 when it was \$732,000,000.

It is, therefore, necessary to go back more than a decade to find a year when the net increase in the investment in the railways was larger than in 1923. The investment made in them in 1910 was almost \$950,000,000 and in 1911 it exceeded a billion dollars. The statistics published by the Interstate Commerce Commission until within recent years showed smaller increases for 1910 and 1911, but these are the increases shown by its latest statistics.

The investment of a given amount of capital now probably will not effect an increase in facilities more than onehalf as great as 10 years ago. Railroad development, in spite of the recent revival, is not going forward at a rate approaching that which prevailed prior to ten years ago. But there is an important difference between the nature of it then and now. It was largely extensive then. In 1910 the increase in the railway mileage of the country was 3,459 miles and in 1911 it was 3,886 miles. A large part of the new capital going into the railways then was being spent for the construction of new lines. Within recent years the total miles of railway in the country has been declining. Practically all the new capital invested has been used to increase the capacity of existing lines. When allowance is made for this difference it will be seen that the capital expenditures of 1923 were relatively very large.

There is not such need for the construction of additional mileage to develop new territory as was the case up to ten years ago. There is greater need than there was then for intensive development of existing lines. Now, other things being equal, a given investment of new capital in existing lines will increase the amount of business a railway system can handle more than an equal investment for construction in new territory. The increase in investment per mile of road in 1911, when the total investment made in railway property was the largest on record, was \$2,133. The investment made per mile of road in 1923 probably exceeded \$3,700. This is undoubtedly the largest investment per mile of road ever made in one year, and the increase in carrying capacity effected was relatively very large.

It is interesting to speculate whether the revival of railroad development which began in 1923 will last, and if so, how long. It was clearly foreshadowed in information published in our Annual Statistical Number a year ago. This showed that 27 railways operating approximately 95,000 miles, had at the beginning of last year definite plans for making capital expenditures of over \$350,000,000 during the year. On the basis of this information the Railway Age estimated the total capital expenditures during the year would be around \$700,000,000. Our estimate proved much too small, although it seemed when made to be optimistic.

In the present issue of the Railway Age we publish an article showing that 34 railways operating 109,415 miles, already have definite plans for making capital expenditures in 1924 aggregating over \$350,000,000. In view of the experience of last year, and for other reasons given in an article appearing elsewhere in this issue, entitled "Railways Will Make Many Improvements in 1924," it seems reasonable to estimate that total capital expenditures in 1924 will be approximately as large as in 1923."

But many railway companies do not make up their budgets for the year until well after the beginning of the year. How much new capital they invest depends largely on prospective and actual developments. What is in the minds of railway executives is indicated by articles by 15 of them which are published elsewhere in this issue. The consensus of opinion is that the traffic of 1924 will be approximately the same as that of 1923, but many railway executives, especially those whose lines serve union mines, are troubled by the prospect of a coal strike in the spring which some anticipate will last three or four months. What Congress will do with respect to railway regulation also is causing fear and hesitation. Railway executives are almost unanimous in expressing the view that repeal of the rate-making provisions of the Transportation Act would cause a sharp reduction of the investment of new capital in the railways.

Probably the principal factor in determining appropria-

tions for new facilities is the net return earned. This depends, of course, upon operating expenses and taxes as well as upon total earnings. If traffic should be as large as in 1923, and there should be no increases in wages or in the prices of fuel and materials, the net operating income earned this year probably would be somewhat larger than in 1923. But some classes of employees are asking for large advances in wages; and a coal strike would increase fuel prices.

It is absolutely necessary that the net return now being earned by the railways should not only be maintained but increased if adequate expansion of their facilities is to continue. Practically all the new capital raised in recent years has been raised by the sale of bonds and other evidences of indebtedness. Unless a large part of the railway system of the country is to be put in jeopardy of bankruptcy more financing must be done in future by the sale of stock. If this is to be done the railways must have more net income available for dividends. Under present financial conditions no railway which is paying less than 7 per cent dividends and is not earning a margin in excess of the amount required to pay them can sell any considerable amount of stock at Without an increase in net operating income the requisite amount for dividends will be available to only a relatively small number of companies.

The need for continuance of large expenditures to increase the capacity of the railways is recognized by railway executives. This was shown by the data furnished recently by them in response to a questionnaire sent out on behalf of the Committee on Governmental Relations to Transporta-

tion of the Chamber of Commerce of the United States. The Railway Age gives the first detailed analysis of the replies made to this questionnaire yet made public in an article appearing elsewhere in this issue, entitled "Capital Expenditures for the Next Ten Years." Roads having about 65 per cent of the total mileage of the country and handling almost 68 per cent of the total freight business, made estimates of their requirements during the next ten years indicating that in this decade the investment made in all railway properties should average approximately \$800,000,000 a year. The greatest problem confronting the railway managements, and one of the greatest problems confronting the nation, is that of making it possible for the railway companies to raise this new capital. Under a wise policy of regulation the problem can be solved. An unwise and restrictive policy of regulation will make its solution impossible.

On the whole, the railway outlook for 1924 may be regarded with considerable optimism. The danger of adverse legislation by Congress seems to be steadily diminishing. There is no warrant for large increases of wages and other expenses, and there seems reason for anticipating reductions of maintenance of equipment expenditures. Most classes of traffic continue to move in large volume, although the abnormal decline of coal shipments recently has had a bad effect on the business of some roads. It seems reasonable to anticipate at the present time that net operating income will be somewhat larger than in 1923, and capital expenditures as already stated, for equipment and improvements, according to present indications, will continue to be heavy.

# Operating Efficiency in 1923

THE STATEMENT that the railways attained greater efficiency of operation in 1923 than ever before has been made so often that it has become almost trite. It would appear, however, that there is prevalent an erroneous impression as to what were the true measure and character of the efficiency attained. The freight business handled was larger than ever before, but the number of tons carried one mile was only about 2½ per cent greater than in 1920, the previous record year. This was not a large increase, considering that three years had elapsed.

The operating efficiency of 1923 was notable, not because of the increase in the business handled, but because, after the early part of the year congestions and car shortages were avoided and in consequence, in spite of a record-breaking business, the quality of the service rendered to shippers was, considering the volume of business, almost unprecedentedly good.

The real test of what the railroads could do came in October. It came and was passed without most shippers knowing that a test was occurring. The density of the freight business handled in that month was not only greater than in any other month of the year, but greater than in any previous month in history, excepting August, September, and October, 1920. The number of tons carried one mile per mile of line per day in August, 1920, was 5,917; in September, 5,872, and in October, 5,901. The number of tons carried one mile per mile of line in October 1923, was 5,803. This was only about 2 per cent less than in the record month of

August, 1920, and was 7 per cent greater than the density of traffic in October, 1922. In August, September and October, 1920, however, the net car shortage averaged over 100,000 cars, and in October, 1922, it became as much as 175,000 cars, while throughout October 1923 there was a small car surplus. There were hardly any congestions in terminals and no unusual delays in furnishing cars to shippers or in moving shipments.

The remarkable success of the railways in handling the fall peak load of 1923 was not due to heavy loading of cars. The average load per loaded car in October 1920, was 29.9 tons, while in October, 1923, it was only 27 tons. The principal factor which enabled the carriers to bear up under the peak load so successfully was the notable increase in the average miles that each freight car was moved daily. The average miles per car per day in October, 1920, were 28.6 miles, while in October, 1923, there was attained the recordbreaking figure of 30.7 miles. The difference between the average miles traveled daily by each car in October, 1920, and 1923 was quivalent to an increase of 184,000 in the number of freight cars in service. Of course, the effect of this was largely offset by the decrease in the average load per car, but without the speeding up of cars which was effected the operating results secured would have been widely different.

When other operating statistics of 1923 are compared with those of 1920 an improvement in efficiency almost all along the line is disclosed. In the first 10 months of 1923, in 1

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spite of an increase in the proportion of empty car mileage and a decline in the average load per car, the average tons hauled per train were 719 as compared with 715 in the corresponding months of 1920. This increase in average tons per train was due to the fact that the average number of freight cars hauled in each train increased from 38.4 to 41.3. The average speed of trains in these months was increased from 10.3 in 1920 to 10.8 miles in 1923. Average miles per car per day increased from 24.9 to 27.9, and in spite of reductions in the average load per car the average daily freight service rendered by each car increased from 499 to 517 tons carried one mile. For the 10 months' period the number of tons carried one mile per mile of road per day showed an increase as compared with 1920 from 5,320 to

The principal fly in the ointment is the record of locomotive performance. The average miles per locomotive per day declined from 62½ in 1920 to 60.8 in 1923. It is plain that while the railway managements are giving attention to the speeding up of cars they ought also to be giving increased attention to the problem of increasing the mileage made by each locomotive. For a long period they have been increasing the number and tractive power of locomotives faster in proportion than they have been increasing the terminal and other facilities needed to enable them to secure the greatest practicable utilization of locomotives. The problem presented is a financial and engineering as well as an operating

problem, and one of the most valuable things railway executives could do in 1924 would be to study and carry out improvements and methods that are needed to enable the railways to get increased service from each locomotive.

The effect of improvements in facilities and methods upon efficiency of operation is best appreciated when the results obtained over a long period of years are surveyed. In 1913, ten years ago, the average tons per loaded car were only 21; average miles per car per day only 24½, and the average service rendered by each freight car daily was the equivalent of carrying 399 tons one mile. This compares with 517 in the first 10 months of 1923, the increase being 80 per In 1913 the average tons of freight hauled per train was 445, while in the first 10 months of 1923, it was 517, the increase being 38 per cent. In other words, if the traffic of 1923 had been handled with the average train load of 1913, the number of miles that freight trains would have had to be run would have been about 40 per cent greater than it actually was, and the additional operating expenses incurred would have been many hundreds of millions of dollars. The public has received the benefit of almost all the savings effected. The stockholders of the railways have received none of the benefit, since the dividends from income were larger in 1913 than they have been in any year since. The stockholders will have to continue to hope, and we trust with some reason, that there will yet come a better day for

# The Improvement in Public Sentiment

A MONG THE THINGS for which the railway year 1923 was notable was unprecedented efforts by the railways, both by groups and individually, to educate the public regarding transportation problems.

The American Railway Association in April adopted and announced a program for increasing the efficiency of operation and rendering an adequate transportation service. As a result both of the co-operation and the individual efforts of the roads under the leadership of the association's officers, the program was splendidly carried out. Throughout the time it was being carried out widespread publicity was given to the progress being made. It would be difficult to exaggerate the value of the effect upon public sentiment of what was accomplished and of the publicity that was given to it.

Meantime, the eastern and western presidents' committees on public relations and the officers of individual lines assiduously disseminated information regarding the railroad situation and data and arguments combating criticisms of the roads and opposing radical policies of regulation which were being advocated. Never were so many addresses made, so many statements issued, so many advertisements published, to refute misrepresentations and in favor of a sound policy of regulation.

What the final result of the efforts being made to educate public opinion will be only the future will reveal. Since Congress convened numerous bills for more restrictive and reactionary regulation have been introduced. There is still going on a strong agitation for reductions of rates, especially upon certain farm products, which disregards the plain fact that without substantial reductions of railway operating expenses and taxes no substantial reduction of rates can be made without bankrupting many railways and doing much more harm than good to producers and shippers.

One thing, however, seems to be beyond serious question. This is that, mainly owing to the public relations work that has been done, there has been a marked increase of public understanding, and a great change of public sentiment, regarding railway matters within the last two years, and especially within the last year. Two years ago the demand for reductions of railway rates seemed almost universal. At

that time, although the railways had voluntarily announced a 10 per cent reduction in all freight rates on farm products, the Interstate Commerce Commission put into effect reductions of 16 to 21 per cent on grain and grain products. Six months later, in the middle of 1922, it reduced all other freight rates 10 per cent. These things were done regardless of the fact that the railways had not been and were not then earning anywhere near the net operating income the Commission had held would be a fair return. They were done principally because of the pressure of public sentiment.

The railways earned relatively a much larger net return in 1923 than in the two previous years. Demands for reductions of rates on farm products, especially grain, were renewed. The Interstate Commerce Commission declined, however, to grant them. What was more significant was that there were almost no demands for reductions of rates on other commodities. The business interests, in fact, lined up almost unanimously with the railways in opposing reductions of rates. They clearly recognized the fact that what the country needed was improvement and expansion of the railway plant, and that these things were incompatible, under the conditions existing, with reductions of rates.

Railway officers are anticipating with apprehension what Congress may do in its present session. There are encouraging signs, however, that the onslaught of the radicals upon the railways is going to be resisted by many, and perhaps a majority, of the members of Congress. If this proves to be the case, it will be due to the predominant public sentiment of the country. Even should some railway legislation be passed, it seems improbable that it will be very radical. Furthermore, with the growing public sentiment in favor of rational treatment of the railroad problem, there would be good ground for hoping that mistakes made by this Congress would soon be rectified.

The results gained by the public relations work done recently are but an indication, although a strong one, of what can be accomplished by continuance and increase of work of this kind. The railways for years have been the objects of bitter criticism and attacks from many sources. Until some 18 or 19 years ago there were reasons for them. Since

then the secret rebating, financial practices and political activities which invited and provoked these attacks have been There is today no large industry in the world which is more strictly regulated or which is managed with more scrupulous honesty and regard for public rights and interests than the railway business of the United States is. The attacks upon it have continued largely because many people do not realize how completely the old abuses have been abolished, and because, since the railways are subject to regulation, politicians can use political methods and government machinery to assail them. Another very important reason for the continuance of these attacks has been that although, because they are subject to regulation, it is absolutely necessary for the welfare of the railways that there should be, in regard to them, an intelligent and friendly public sentiment, they were long to answer attacks and remiss in placing the facts about their business and its needs before the public.

The experience of the public utilities within recent years shows that business concerns may be subject to government regulation and, at the same time, secure fair and even friendly treatment from the public. The largest public utility in the United States is the American Telephone & Telegraph Company. It operates in and derives its earnings from all parts of the country, and it pays dividends of 9 per cent on its stock, yet there seldom or never is heard any demand for reductions of its rates upon the ground that its net earn-Practically the same thing is true of ings are too large.

many other large public utilities.

The railways render a service to the public which, it is no exaggeration to say, exceeds in amount and importance the service rendered by all the public utilities in the country.

The railways ought to be and can be made as popular as any class of business concerns in the country. There can be created a public sentiment which will recognize the fact that in fairness and in the interest of the public itself they should be allowed to earn enough net operating income to pay all their fixed charges and have left a net income averaging 8 or 10 per cent on their stock. It will, however, require great efforts to create such a public sentiment. It will be necessary for officers of the railways to strive to their utmost to give the public everywhere good treatment and good ser-It will be necessary for them to spare no pains to inform the public as to the facts regarding their business. It will be necessary for them to exercise a high type of statesmanship in dealing with all questions that arise affecting their relations with their employees and patrons.

Railway officials are equal to the task if they will but try constantly to perform it. But they must rid their minds of certain illusions that still prevail in some quarters. They must recognize the fact that public relations work is and always will be as essential a part of the management and operation of a railroad as the running of its trains. It is not something which should be done merely to meet a crisis-it should be done when there is no crisis to prevent crises from constantly recurring. The man who is always well is the man who takes medical advice, rest and exercise to avoid getting sick. The man who has frequent sick spells and never does anything for his health except when he is ill usually soon goes where no physician or physical director can help him. The railways have had so many serious illnesses within the last 20 years that they ought to have learned by this time to adopt methods for avoiding violent attacks, instead of for merely fighting them off.

### Railway Purchases as a Factor in Prosperity

THE INTIMATE RELATION which railway purchases bear to I general industrial activity is evidenced by the conditions which prevailed during 1923. The roads made unusually large additions to their equipment and roadway facilities and equally liberal appropriations for current maintenance. the same time, according to Secretary Hoover, the manufactured production of the country was 15 per cent greater than in 1922 and 10 per cent more than in 1920. More particularly iron and steel production, which enters largely into cars, locomotives, track and other forms of railway construction, increased 40 per cent over 1922, while the production of lumber, largely used by the railways, increased 10 per cent.

The roads expended \$1,075,897,940 for improvements during 1923. Of this amount nearly \$700,000,000 went to railway equipment and supply companies for equipment, while of the more than \$375,000,000 which was spent for additions to roadway and structures, at least \$200,000,000 went to other companies for materials and for labor employed by them. In addition, the roads spent more than \$1,200,000,000 for materials and supplies other than fuel, used in current operation and maintenance, so that their contribution to the manufacturing activity of the country last year exceeded \$2,100,000,000, making them a most potent factor in industrial prosperity. These figures take no account of the large expenditures made for fuel, or the much larger wage payments to railway employees

As pointed out in detail elsewhere in this issue, the indications are that the railways will continue their improvement programs on approximately the same liberal scale during 1924. In support of this forecast, the Bureau of Railway Economics has estimated from data furnished by the roads that 1923 appropriations aggregating \$300,806,519 have been carried over into 1924. In addition, information which has been furnished to the Railway Age by roads comprising 40 per cent of the mileage of the United States shows

work already planned for this year aggregating more than \$280,000,000 additional to that carried over by these roads. Comparison with similar statistics prepared a year ago shows that the volume of work carried over and in contemplation is practically equal to that at the beginning of 1923, and leads to the conclusion that 1924 will be a year of large expenditures by the railways for improvements.

The outlook with respect to the maintenance of the properties is equally optimistic, particularly with reference to the While it is not to be expected that the fixed properties. roads will be required to spend as large sums for the proper care of their cars and locomotives as was necessary during 1923 to enable them to overcome the effects of the shop strike, the liberality of the programs in general indicate that this work will not be neglected and that sufficient appropriations will be made to enable the equipment to be maintained.

The outlook is particularly encouraging in the maintenance of way field in spite of the fact that the expenditures in this department were large in 1923. Thus, although the tonnage of rail rolled last year exceeded that for any recent year by a considerable proportion and was more than 20 per cent greater than in 1922, the orders which have been placed by the roads so far this year are in general larger than those placed by the same roads last year. The same is true of track specialties, several orders for tie plates and other fittings being of record proportions. Railroad buying constituted the mainstay of the iron and steel manufacturers, in the latter part of 1923, and the rail mills are already booked to capacity for the first half of 1924. The prosperity of a large part of the manufacturers in 1923 was due to railway purchases; and the prosperity of the industry of the country in 1924 will depend to a very large extent upon whether the railways are given an opportunity by Congress and other bodies that regulate them to continue to make needed purchases for maintaining and enlarging their facilities.

# General Review Section

United States, Canada and Mexico

Railway Executives on Outlook for 1924

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Benefits of Wholesale Consolidations Exaggerated, by J. Kruttschnitt, Chairman, Southern Pacific Company.

Prospects for Good Railway Business in 1924, by Carl R. Gray, President, Union Pacific System.

Repeal of Section 15-A Would Drive Away Investors, by W. J. Harahan, President, Chesapeake & Ohio.

Changes in Transportation Act Undesirable, by C. E. Schaff, President, Missouri-Kansas-Texas Lines.

Business Prospects of 1924 Good, by E. E. Loomis, President, Lehigh Valley.

Capital Expenditures Will Depend on Attitude of Congress, by W. B. Storey, President, Atchison, Topeka & Santa Fe.

Employee and Public Relations Work Should Be More Local and Intensive, by J. M. Kurn, President, St. Louis-San Francisco.

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Business of 1924 Will Closely Approximate That of 1923, by L. W. Baldwin, President, Missouri Pacific.

Fair Dealing Will Win Confidence of Employees, by J. E. Gorman, President, Chicago, Rock Island & Pacific.

Railways Will Make Many Improvements in 1924.

New Records for Transportation Performance.

Capital Expenditures for Next Ten Years.

Prices Maintain Uniform Levels During 1923.

The Year's Tendencies in Equipment Design.

Railway Valuation Becomes Political Issue.

Canada Is Now More Hopeful of the Future.

The Mexican Railways Continue to Improve.

# Railway Executives on Outlook for 1924

## Good Traffic in Prospect—Expenditures for Improvements Will Be Large If Adverse Legislation Is Not Passed

A NUMBER of railway executives were asked by the Railway Age to contribute their views to the present issue of this paper regarding the following matters:

"1. Prospects of traffic in 1924.

"2. Whether distribution of traffic throughout the year probably will be as nearly uniform as in 1923, and the effect that would be produced on the transportation situation by a revival of wide seasonal fluctuations of traffic such as occurred in former years.

"3. Whether capital expenditures to increase facilities in 1924 will be as large as they have been in 1923.

"4. Effect upon the railway situation, especially on programs of improvement and expansion, which would be produced by legislation by Congress, and especially the effect that would be produced by repeal of Section 15-A of the Transportation Act.

"5. Changes, if any, favored by you in provisions of the Transportation Act regarding consolidations.

"6. Best means of promoting better understanding of the railroad problem by railway employees and the public."

The accompanying articles were prepared in response to this request. It will be noted that the writers substantially agree in expressing the belief that The railway traffic of 1924 will not differ widely in amount from that of 1923.

There may be wider fluctuations of traffic than in 1923, but there is no reason for believing the railways will have much difficulty in handling it.

3. If the managements of the railways are not interfered with by adverse legislation by Congress or adverse regulations in other forms, capital expenditures to improve and increase the capacity of the properties will be continued on a large scale.

4. The passage of adverse legislation by Congress, such as is advocated by radicals, would curtail the capital ex-

penditures that otherwise would be made.

5. While the Transportation Act is not a perfect law, it is best that it be left unchanged for the present. However, it would be helpful if its consolidation provisions were so modified as to make voluntary consolidations, with the approval of the Interstate Commerce Commission, easier to effect.

6. It is of great importance that work to educate the public and railway employees about the railway situation should be continued on a large scale, this educational work to consist chiefly of presenting to them in an interesting and understandable way the actual facts.

# Benefits of Wholesale Consolidations Exaggerated

By J. Kruttschnitt

Chairman, Southern Pacific Company

1. It is early to make estimates of the crops in 1924, many of which are dependent on contingencies that may occur up to the time of actual harvesting; we believe, however, that conditions now prevailing justify expectation of good crops in 1924. Demand will, of course, control prices. The purchasing power of the nations in Europe which furnish our principal markets is limited by existing conditions, but unless they get very much worse, our farmers may hope for prices substantially as high as now prevail. Consequently, business should be good and of satisfactory volume. Car loading figures have continued at so high a level so late in the year that it is safe to expect continued increases in 1924. Estimates must be made with so many "ifs," implied and expressed, that they must be reckoned with and weighed in making them.

2. The wish is father to any opinion as to the equable distribution of traffic through 1924. A mere enumeration of the causes that may influence an even flow of traffic will show how unreliable any opinion on the question must necessarily be; for instance, (a) possibilities of strikes; (b) the maturing of crops, the seeds of many of which are not yet in the ground; (c) market conditions that determine whether produce will move or be held because of prices; and, above all, (d) the fear of hostile and ill-considered legislation

in Congress.

3. The same reasons mentioned in answer to No. 2 will affect capital expenditures. Based on these expenditures actually made for 1923, which were more than \$1,000,000,000, it is probable that, unless checked by the doings of Congress, capital expenditures in 1924 will approach this sum. Unfortunately, as the roads have so far not earned

a fair return upon their investment, made for the benefit of the public, the sale of railway stock has been impossible. During the years 1920, 1921 and 1922—all years of unfavorable net income-only 2.2 per cent of the new capital secured by the railways was obtained by stock issues, whereas public utilities, industrials, shipping and miscellaneous enterprises secured 32.7 per cent of their new capital by stock sales. During 10 months of 1923 the railways obtained only 4.1 per cent of their new funds by stock issues, and until the net income of the roads is stabilized at a rate of return comparable with that yielded by other investments it is certain that the railway requirements for new capital must be furnished through bond issues. The public is not willing to participate in partnerships in railroads where returns are limited to amounts below those of industries, banks, etc., and which are prevented by regulations from even earning the allowed return.

4. It is generally believed that the action of the carriers in April, 1923, in determining to make large expenditures for equipment, additions and betterments, etc., has had much to do in the way of influencing the tide of prosperity that we have enjoyed during the current year. These expenditures were made in the faith that strenuous efforts and large expenditures made to give the public better transportation facilities than it had ever enjoyed would influence the public and their servants in Congress to allow the Transportation Act to function untampered with long enough (a number of years at least) to enable the railroads to adjust themselves thoroughly to changed conditions brought about by the war. Opinions expressed by commercial bodies, by the press almost unanimously, by the Interstate Commerce Commission

in its annual report just issued, and by some members of the Commission individually, prove that the success of the efforts of the carriers to serve the public promptly and efficiently is recognized; but the flood of bills already introduced in Congress would seem to show that its members do not fairly represent the views of their constituents. If the Transportation Act is amended to the extent indicated by the threatened legislation I believe that expenditures the railroads will be able to make will be very much curtailed because of the unwillingness of investors to furnish money in such conditions.

I believe the benefits expected from consolidations have been grossly exaggerated. With all the roads consolidated into one system during federal control the Director General of Railroads told the Senate Committee on Interstate Commerce that the saving through consolidation in 1918 over 1917 amounted to \$118,000,000, or about 21/2 per cent of the revenue that year. But \$80,000,000 of this sum represented curtailed passenger train service submitted to by the public for patriotic motives only, \$38,000,000 represented so-called economies, a sample of which is the sum of \$6,000,000 salaries of corporate officials dispensed with, though in subsequent investigations it was shown that this amount was secured at a cost of \$7,168,000, each dollar saved costing \$1.20. "Compulsory consolidation" is a mere paraphrase for government ownership. A great many consolidations could have been made since the return of the roads to their owners in the past three years, and may still be made without waiting for the publication of a comprehensive plan, if permission were given to the carriers to make them, subject to the approval of the Interstate Commerce Commission.

6. I believe the education of employees by means of circulars, magazines, lectures, conferences with their officers on safety and other operating matters, has accomplished much, and if continued will further promote harmonious relations between employer and employee. I also believe the general recognition of the excellent service given by the railways this year should demonstrate the unwisdom-because unnecessary-of further hostile and repressive legislation. The enthusiastic rally of the people of the United States to the support of the courageous gentleman in the White House dooms to failure the dishonest and malicious anti-railroad propaganda launched by politicians, and inspires hope of definite relief from the continued agitation of the "railroad problem."

# Prospects for Good Railway Business in 1924

By Carl R. Gray President, Union Pacific System

1. If conditions in the west do not suffer from any adverse reflex from the east, my judgment is that the aggregate volume of traffic in 1924 will closely approximate that of the year just passed.

2. It is not possible for me to forecast the question of traffic fluctuations. My judgment is that there is danger along this line, but it is a fact that the railroads are better prepared in both equipment and facilities than they have ever been before to meet conditions of this character.

3. Very few lines have determined upon their capital expenditure program for 1924 and legislation will affect it very materially. I do not anticipate, in any event, a program quite so ambitious as that attempted in 1923, nor is it necessary.

The repeal of Section 15-A would unquestionably be adverse with respect to its effect upon railway credit and would undoubtedly affect the ability of some carriers on that account to carry out such a program of construction, improvements and betterments as they would otherwise attempt. The greatest difficulty about a repeal of this section is the effect upon the investor's mind. While in practical effect the railroads have a constitutional right to a fair return, it has been proven in practice difficult to enforce, and the repeal will doubtless be interpreted by many as evidence of a determination that the railroads shall not have a fair

5. While I oppose any changes in the Transportation Act until it has been given further trial, the consolidation section would be helped by an amendment which would not tie the program up to any fixed plan, but would give the railroads an opportunity, initially, to propose consolidations for the approval of the Commission. There is nothing new in the theory of consolidations because they have been in vogue for many years, until by legislation the railways were so restricted as to practically put a stop to the perfectly natural process of evolution in consolidation.

6. The best means of promoting better understanding is by acquainting railway employees and the public with railroad problems and stating them in the simplest terms and treating them individually and not at too great length. Material progress has been made along this line in the past year and an elaboration of a program which has been followed by a number of western lines is the most desirable

# Repeal of Section 15-A Would Drive Away Investors

By W. J. Harahan President, Chesapeake & Ohio

Replying to your letter asking certain specific questions with reference to the railway situation for next year; of course, there is a great deal of uncertainty involved in answering these questions, and I can only answer them in so far as the situation with which I am familiar is concerned, as I do not know what the conditions are in other sections of the country.

1. I feel that we should have as much traffic in 1924 as we did in 1923, perhaps more. If we should have a coal strike, this company would, of course, be called upon to

transport an excess amount of coal during the time the strike was in effect, because of the fact that a large number of our mines work in the event of strike.

This to a certain extent answers your second question. A wide fluctuation in business always means an increased cost of handling it, because of the necessity of providing for a peak movement instead of a more gradual movement.

3. We expect to expend as much in 1924 as we did in 1923, and, in fact, more.

4. I believe that the repeal of Section 15-A of the Trans-

portation Act with reference to the method of rate making would be of distinct harm to the railway situation, due to the fact that it would drive away many investors who would be willing to invest under the present law, but would not feel like doing so if the law was modified by the repeal of Section 15-A. In other words, the government now commits itself to the attempt to make rates which should insure a fair return on the investment, although, of course, they guarantee nothing. The very fact of the repeal of such a provision would be, I think, detrimental to the general railway situation.

5. With reference to the question of change in the Transportation Act regarding the consolidations, I feel that if this portion of the Act could be changed so that voluntary consolidations subject to the approval of the Interstate Com-

merce Commission would be allowed that it would greatly increase the possibility of consolidations being made. I do not think that any unnatural consolidations will be made under any condition. If the railroads are encouraged to consolidate and allowed to do so, I feel quite sure a number of consolidations will be made which will benefit the situation and bring about eventually what it is hoped to bring about by the policy of consolidation.

6. The only way that I know of promoting a better understanding of the railroad problem by railway employees and the public is to keep incessantly at the policy of furnishing information to the public and employees. We are doing this in our public relations work with the idea of accomplishing something along these lines, and are noting some progress coming from our efforts.

# Changes in Transportation Act Undesirable

By C. E. Schaff

President, Misouri-Kansas-Texas Lines

1. In the southwest, general conditions at this time do not warrant anticipation of greater traffic volume in 1924 than was enjoyed in 1923. Several factors influencing traffic suggest probability of slight decrease in volume, but with normal agricultural productions and continued progress toward improvement of the situation of southwestern farmers, business for the year should not be substantially less than in 1923.

2. Traffic equal in volume to that handled last year can be moved by Southwestern lines without seriously taxing their capacity, if there is no more than normal seasonal variation in volume. With continued employment of the methods so successfully used in 1923 to influence uniform movement, we should be able to avoid recurrence of congestion and equipment shortages, which have been incidental to heavy seasonal traffic in past years.

3. Additions to facilities and equipment during the past two years have helped the situation greatly. Whether help in this direction is to continue depends very largely upon the attitude of Congress. A governmental policy toward railroad investment and toward regulation of the carriers, which investors may safely regard as permanently established, is of course essential to steady expansion of transportation capacity.

4. If Congress, through its attitude, indicates that the policy toward railroad investment is to be materially changed, or perhaps reversed through repeal of Section 15-A of the Transportation Act, decreased capital expenditures for railroad transportation purposes in this country in the future must be anticipated.

It, therefore, will be most fortunate from a railroad standpoint if Congress indicates that there is to be no material change in the legislative policy with respect to railroads as declared in the Transportation Act.

5. The railroads have made distinct progress, as shown by the 1923 record, toward providing the country with an adequate transportation plant and with adequate and efficient service. To seriously consider changes in the legislative conditions under which the railroads must operate, until it is more clearly developed just what changes will promote the public advantages, will make the task of railroad management more difficult. While there are provisions of the Transportation Act, notably those relating to consolidation, which should be so modified as to encourage voluntary consolidations, the necessities are not so immediate as to demand legislative action at present, with the attendant probability of disturbance in the whole field of railroad regulation.

# Business Prospects of 1924 Good

By E. E. Loomis President, Lehigh Valley

1. Business prospects for the railroads in 1924, in my judgment, may be viewed with optimism. I have faith in the common sense of the American people. The constructive suggestions offered by Secretary Mellon for tax reductions, if enacted into law, promise prosperity for all the people.

2. In any event, I expect good business in 1924, not a period of high peaks of activity but a steady year with enough traffic to keep the railroads active.

3. The outstanding feature of the railroad situation today, as I see it, is the necessity of giving the transportation system of this country a legislative holiday. Many of our national lawmakers are busily engaged at the moment in preparing bills with which they expect to accomplish what they regard as great things. Some have one object in view, some another, but, as I see it, whatever they propose will lead to an unsettlement of conditions which will seriously

affect the operating efficiency of the railroads at a time when the people of the United States can ill afford it.

4. Capital expenditures for the improvement of facilities in 1924, in my judgment, will be affected largely by developments at Washington. If the advocates of government ownership, confiscatory freight rates and other schemes for hampering the carriers attain any degree of success, however, railroad credit will suffer severely, and there will be little disposition to go ahead with improvements.

5. On the other hand, if Congress leaves the railroads alone, I believe they will provide considerable stimulation to business through their own purchases for improvements and the expansion of their facilities. The carriers spent practically a billion and a half dollars in the last year, when the railroads were given a rest because Congress was not in session, and have announced a new program calling

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for heavy expenditures in 1924 which can be carried out only if there is no political interference. Certainly expenditures cannot be authorized with any degree of safety with the possibility of confiscatory legislation constantly hanging over them.

6. I think the public's understanding of the railroad situation is improving, and there is likewise a general spirit of co-operation on the part of the rank-and-file of railroad employees. This is due, in my judgment, to better understanding on the part of both employees and the public of the difficulties under which the railroads have been forced

to operate and a more general realization of the importance of an efficiently operated railroad system to the commercial prosperity of this country. I think there is still a great deal more for the railroads to do in this direction. Meeting employees or shippers in around-the-table conferences for the settlement of points in question is something to be encouraged. Such a plan banishes a large element of government interference and works for a better understanding by everyone. The more the railroads take the public into their confidence the stronger will be their position with both the public and their employees.

# Capital Expenditures Will Depend on Attitude of Congress

By W. B. Storey

President, Atchison, Topeka & Santa Fe

1. "Prospects of traffic in 1924."

So far as I can see, there is no reason to anticipate any

marked change from 1923.

2. "Whether distribution of traffic throughout the year probably will be as nearly uniform as in 1923, and the effect that would be produced on the transportation situation by a revival of wide seasonal fluctuations of traffic such as occurred in former years."

This will depend, it seems to me, partly upon shippers and their co-operation by shipping early to avoid the normal fall rush of traffic, and partly upon market conditions. It seems likely that there will be a greater fluctuation of traffic in 1924 than in 1923 when conditions were peculiarly favorable to an even distribution of traffic, but unless a very abnormal situation is developed the railroads ought to be able to take care of the peak of the traffic load comfortably.

3. "Whether capital expenditures to increase facilities in 1924 will be as large as they have been in 1923."

This will probably depend to a considerable degree upon the attitude shown by Congress. If it insists upon tampering with the Transportation Act and amending it in the various radical and unfavorable ways which are suggested in some quarters, undoubtedly railroad securities will be depressed and railroad financing for capital expenditures will be materially impeded and such expenditures correspondingly reduced.

4. "Effect upon the railway situation, especially on

 "Effect upon the railway situation, especially on programs of improvement and expansion, which would be produced by legislation by Congress, and especially the effect that would be produced by repeal of Section 15-A of the Transportation Act."

This question has been answered partly by my reply to Question 3. As to the repeal of Section 15-A, this would not necessarily harm the railroads, although it would tend to make their situation more doubtful in the public view, and if it led the Interstate Commerce Commission to feel that there is less necessity for it to allow reasonable rates, the result would be harmful to the railroads. I do not feel that the repeal of this section would necessitate any change in the attitude of the Commission toward reasonable rates.

5. "Changes, if any, favored by you in provisions of the Transportation Act regarding consolidations."

At the moment, I do not favor any changes in the Transportation Act, although I do not believe that the exact provisions of the Transportation Act, with respect to consolidations, can be carried out and that, therefore, ultimately some change may be found desirable.

6. "Best means of promoting better understanding of the railroad problem by railway employees and the public."

I see no better way than that which is now being followed, of furnishing exact facts with respect to railroads to the employees and to the public through statements by the press, through advertising, and through addresses and statements by railway officers and employees. In addition various institutions, other than railroads, and associations can and are giving valuable help by their own statements, which carry weight because they are disinterested.

# Local Intensity Needed in Employee and Public Relations Work

By J. M. Kurn

President, St. Louis-San Francisco

1. I rather incline to the view that we can discount the effects of a presidential year, possibly to the extent of indicating that there is no reason why 1924, traffically speaking, should not be an exceptionally good year. Throughout the agricultural districts, there has been an abundance of moisture which put the ground in very good shape for fall plowing and seeding, and without question a reservoir of moisture has accumulated which will put the farming condition, relatively speaking, higher than it has been for the last four or five years.

All forms of industry seem to reflect an optimistic atmosphere which must, and unquestionably will, project itself into a form of real activity for 1924, at least the first half thereof.

In our section of the Southwest, as is well known, the oil industry, commencing early in the spring of 1923 and up to date, has undergone a severe pressure, the reasons for which, without question, are gradually disappearing and which will ultimately mean that 1924 will have an oil traffic greatly in excess of 1923.

2. I incline very strongly to the belief that the normal flow of traffic will be fairly distributed and will probably, as to uniformity, compare most favorably with 1923.

3. The question of capital expenditures to increase facilities in 1924, in a great measure, will depend upon the legislative consideration given to the transportation question by Congress and legislative bodies throughout the states. One might well reach the conclusion that there is an honest de-

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sire upon the part of the legislative bodies to refrain from any legislation which would be inimical to the best interests of transportation. If this forecast should come true, I feel safe in saying that in order to keep apace with the growth and development of our traffic, further capital expenditures will be required and, to an extent, will be appropriated.

We are working on our budget for 1924, which will cover considerable improvement work but will not be as heavy as for 1923, which included two large mechanical plants and quite a considerable amount of double-tracking that will have been taken care of; in fact, the work on these facilities that started this year will extend over, to a considerable degree,

4. There is no question but that legislation by Congress along restrictive lines would change the programs of carriers as to improvements and expansion, and the repeal or modification of Section 15-A of the Transportation Act would be disastrous, in that that particular section, although generally misunderstood, is the cornerstone upon which will rest future successful financing or capitalization of railroads. When one stops to consider that some of the railroads are already facing the re-financing of a large portion of their bonded indebtedness, any tampering with Section 15-A is going, in my judgment, to make exceedingly difficult the program of

will be compelled to re-finance their properties. 5. I am of the decided opinion that Congress should avoid any positive action in the direction of enacting laws relative to the consolidation of transportation properties. This should be left to individual interests and the Interstate Commerce Commission for future determination, it being my view that there are railroad properties which can, and should be, consolidated in the interest of better development and better

such railroads who, unfortunately, at this particular period

operation, and that such forms of consolidation should be encouraged but left to the initiative of the individual

6. The best means of promoting better understanding of the railroad problem by railway employees and the public, is a question which in my opinion has not received the consideration which it should have, and by this I do not mean to reflect upon the efforts of any group or association. The railway employee problem is within the keeping of the individual management and my opinion is, that it should be left there. Whenever we attempt, through group formations, any corrective measure, dealing with the railway employee problem, we get away from the individual contact of officer and employee to an extent which, my observation leads me to believe, is productive of unfavorable results. Therefore, I emphasize the necessity of working out this problem along the lines of individual managements, rather than through group formations.

As to the public relationship, I feel that we have failed to take into consideration the value of the local man-the local or county newspaper-to such an extent that we must give immediate thought to how to recover this most valuable influence. All of the railroads have spent considerable money, individually and through associations, with the cosmopolitan press, with magazines and trade publications, and I believe I can safely say that none of us have used for legitimate purposes, i.e. advertising, a sufficiency of the funds which have gone in other directions, in our local newspaper publications. Therefore, you can record me as being in favor -in order to accomplish proper results with the public-of a close managerial committee activity with the local business men, and giving a reasonable support to the smaller newspaper publications in towns served by our rails.

# Capital Expenditures Will Be Maintained

By N. D. Maher

President, Norfolk & Western

- 1. The prospects for traffic in 1924, while they may not be peak figures, will be above the average, and we are looking for a steady business. Various conditions may enter into next year's business, such as coal strike, extent of purchases of railroads and improvement in foreign markets.
- 2. With this line we really have very little fluctuation of traffic due to seasonal conditions.
- 3. Our capital expenditures will be close to the amount we spent in 1923, and may be considerably in
- excess, dependent on money market, business conditions, etc.
  4. Injurious legislation passed by Congress affecting the railroads would have a serious effect upon our expenditures for improvements and extensions.
- We would prefer to see the Transportation Act remain as it is for two years more trial.
- 6. Closer contact between officers and employees in many respects is the best means of promoting better understanding of the railroad problem by all.

# Principle of Consolidation is Sound

By Ralph Budd

President, Great Northern

- 1. Nineteen twenty-four promises to be a good year, but probably not so good as 1923 in volume of business handled. The improved condition of equipment over a year ago should be of material assistance in keeping operating expenses down and improving net earnings.
- This depends entirely on the character of traffic and whether there are interruptions by strikes or otherwise. The fluctuation on eastbound traffic was as seasonal in 1923 as
- It is elemental that to whatever extent the total volume for the year can be handled at a uniform rate, the railroads are benefited.
- 3. Capital expenditures will not need to be so large in 1924 as they were in 1923.
- 4. The impending threats of adverse legislation have a very bad effect on the railroad situation because such a condition cannot help causing uncertainty, which prevents the formulation of plans for the future on a sound and definite

The railroads are just now getting into a somewhat less critical status than that prevailing in 1920, 1921 and 1922, and adverse legislation would give them a serious setback. The repeal of Section 15-A theoretically would do no harm, because the railroads are entitled to at least as favorable consideration as Section 15-A provides, but as a practical matter the inclusion of the affirmative principle laid down in Section 15-A seems to be necessary.

5. I believe the principle of consolidation is sound and

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that important improvement in service and reduction in cost without any sacrifice of valuable competition can be looked for through extensive consolidations which bring into single systems railroads serving distinct parts of the country, so as to introduce a diversification of traffic and a consequent stability and a consequent elasticity in the use of equipment which would be of great value. Repeal of the requirement that the Interstate Commerce Commission shall adopt in advance of consolidation a general plan for consolidations; and, instead, introduction of a provision authorizing the commission, upon application of carriers desiring to consolidate, to approve and empower such consolidation in cases where the commission finds that such consolidation would be compatible with the public interest, probably would result in consolida-

tions being brought about more rapidly than they would under the present law.

6. Better understanding on the part of the public can be promoted by continuing to furnish good service and continuing to explain railroad questions fully and frankly through the press and by public addresses. Promoting better understanding by railroad employees is a somewhat different problem, but even more important. It can only be accomplished by efforts on the part of individual roads to get and keep the confidence of their employees by explaining points commonly misunderstood and misrepresented, by fair dealing with the employees, and by making an honest effort in each case of complaint to settle the controversy as promptly as possible.

# Volume of Traffic Probably Will Be Maintained

By H. E. Byram

President, Chicago, Milwaukee & St. Paul

1. I think the outlook for a continuance of the volume of traffic the country has enjoyed during 1923 is favorable for 1924; at least there are no fundamental obstacles apparent at the present time.

2. I do not think there was anything abnormal in the distribution of traffic during the year 1923. On the contrary, it seems to me it was unusually seasonal because there were no interruptions on account of strikes, business depression or other unusual interferences. The tranquil condition of labor during the year contributed largely to the stability of business and contributed largely to the success of the railroads in handling the largest volume of traffic in our history with practically no congestions and consequently little or no shortage of cars or delayed business. With the continuation of the conditions existing during 1923 there is no reason to expect a less favorable distribution of traffic throughout 1924.

3. I do not think capital expenditures for increased facilities in 1924 will be as large as they were in 1923. The railroads had lost a good deal of ground in this direction during the past few years and extraordinary efforts were made to catch up with the needs of the country during 1923, and the manner in which the traffic was moved indicates that these efforts were highly successful. Having moved the largest traffic in the history of the railroads during 1923 with our present facilities and equipment there is not the same necessity for increasing these facilities in 1924 that prevailed in 1923.

4. Unfavorable legislation by Congress against the rail-roads undoubtedly would have the effect of curtailing the expenditures for improvements which might otherwise be made and which, as above stated, will not be so urgent in 1924 as they were in 1923. It is difficult to predict the effect of the repeal of Section 15-A of the Transportation Act because up

to the present time there have been no tangible benefits to the railroads as a result of the limitation of the earnings provision which is the chief feature of that section. On the contrary, its effect has been to create in the public mind, with the active assistance of political enemies of the railroads, the belief that the limitation feature of Section 15-A is in reality a guaranty of a specific percentage of earnings to the railroads. Of course, it is in no sense a guaranty and has produced none of the benefits of a guaranty, but the average citizen has been led to believe it is a guaranty and, therefore, it is quite generally condemned.

5. The Transportation Act has many features which are not entirely acceptable to the railroads, but covering such tremendous operations as are involved in the railroads of the country and the profound effect that further legislative interferences with the orderly operation of the railroad systems of the country would have on our business prosperity I believe it would be better to make no changes in the Transportation Act at present until we have had more experience with the operation of its various provisions to determine which, if any, of them should be changed.

6. I believe the best way of promoting better understanding of the railroad problem by railway employees and the public is by direct contact between officers and employees of the railroads and the communities and individuals along the lines which are served by each railroad. There are no phases of the railroad problem that cannot or should not be discussed generally and frankly by the officers and employees of the railroads with patrons or individuals who may be interested and I think the best way to establish a better understanding is to do it along these lines, in the various ways that have been adopted by the different railroads, suitable to their own conditions and surroundings.

# Railway Management Has Responsibility of Leadership

By C. H. Markham

President, Illinois Central

1. I look for a good volume of traffic in 1924.

2. The uniformity of traffic throughout 1923 has been a prime factor in enabling the railroads to handle the year's business expeditiously and satisfactorily. This speaks well for the "ship early" campaign carried on during the early part of the year by the railroads in conjunction with the Department of Commerce, the various trade associations and individual concerns. We shall do well to continue to call the attention of the public from time to time to the availability

of transportation facilities in periods of traffic recession and urge the stabilization of freight traffic by such methods as have been employed effectively in the last 12 months. The point should be made that wide seasonal fluctuations in freight traffic make it necessary for the railroads to equip themselves beyond what otherwise would be their needs, and that, by having facilities idle during one period of the year and overtaxed in another, there is created an expense which must be borne by the public in high freight rates.

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Moreover, with their present limited facilities, the railroads could not possibly handle the business of the country satisfactorily if there were these wide seasonal fluctuations in traffic.

3. The capital expenditures of the Illinois Central System in 1924 will be about as large as in 1923, with the exception of expenditures for equipment. We have provided ourselves with an abundance of equipment through extensive purchases in the last four years, and we are in good shape, as far as equipment is concerned, to meet the transportation requirements of our territory in 1924. For that reason, our capital expenditures will be directed chiefly at improvement and extension of roadway facilities.

4. It is inconceivable that the Congress will issue a mandate to the investors of the United States that it proposes to depart from the wise principle laid down in the Transportation Act of 1920 of requiring the Interstate Commerce Commission in its rate decisions to "give due consideration, among other things, to the transportation needs of the country and the necessity (under honest, efficient and economical management of existing transportation facilities) of enlarging such facilities in order to provide the people of the United States with adequate transportation."

This would be the effect of repealing the Transportation Act or Section 15A, of which this forms a part of the third

This phase of the Transportation Act, against which the most criticism is uttered, merely gives statutory authority to the Constitution of the United States which declares that "private property shall not be taken for public use without just compensation." It goes no further than the Constitution itself goes. If it were to be repealed, the railroads would doubtless be able to resist unjustified reductions in their rates by recourse to the courts if necessary. It is to be hoped, however, that it will be retained as a pledge of the continuance of a policy of fair treatment in rate regulation. Such a pledge is needed to strengthen the confidence of the investors from whom must be obtained most of the funds for improvements and extensions. Even though it gives them no added legal protection, it is looked upon as a settled policy of government and is therefore of great value.

6. One of the noteworthy items in the achievements of the railroads during the last year has been the betterment of their relations with the public and their employees. Railway executives are coming more and more to look upon these problems as being fully as important as any other phase of railway management.

The morale of the railway personnel is founded upon a knowledge and understanding of the railway situation. Forces are constantly at work to spread false information and create misunderstanding. If allowed to go unchecked, these forces would seriously threaten to undermine the efficiency of the railway service. To meet this situation, to give the officers and employees of the railroads a working knowledge of the facts about their business and to interpret that knowledge to them in a way that will be reflected in loyalty to the railroad and the spirit of railway service, is a task which challenges the managements of American railroads today. It has been well said that the railroads are not only twenty-one billion dollars of invested capital, are not alone the locomotives and cars and roadway and structures and other facilities of the railway plant, but are two million men and women engaged in the operation of this plant provided with these

To the end that their work shall be performed efficiently and economically, in a spirit of true service and a striving for the better things of life, there needs to be leadership from the managements as well as courage and high purpose within the ranks.

The problem of public relations is no less vital; the two go hand-in-hand. The railroads are engaged in a public service and are controlled by legislative and administrative agencies the policies of which are dictated by public opinion. That public opinion must be constructive. It is the duty of every right-thinking, public-spirited citizen to do his utmost to make it constructive, for to the country at large accrue the direct benefits of a well-ordered, stable railway situation. But upon railway management rests the responsibility of leadership. Until that responsibility is fully recognized and accepted, until every proper effort is made to inform the public of the facts about the railroads and railway conditions, there is little hope for the future.

As I have said, I believe railway managements are coming to recognize and accept their responsibilities in these fields. I look for work that has been conducted during the last year to be prosecuted with increasing vigor during 1924.

# Permissive Consolidation Desirable

By E. J. Pearson

President, New York, New Haven & Hartford

- 1. Traffic will average nearly as large as 1923.
- 2. I can see no reason why distribution of traffic should not be as nearly uniform as in 1923. The generally improved condition of the railroads as evidenced by their record in the past season should make it possible for them to more adequately care for fluctuations in traffic that might occur.
  - 3. If action by those in authority is based on the best

interests of the public, I believe railroads generally will have confidence in the future and will develop and enlarge facilities to meet the growing demands of the country.

- 4. The reverse of three.
- 5. Believe permissive consolidations desirable.
- 6. By following the good advice and recommendations of the Railway Age.

# Dangers Political, Rather than Economic

By W. A. Winburn

President, Central of Georgia

You ask my opinion as to the outlook for next year from the standpoint of the magnitude of the program of the railways and the railway conditions in general.

General conditions seem sound and there is apparently no reason to doubt that freight traffic during 1924 will continue approximately as good as during 1923. It is usual to expect disturbed business conditions during a Presidential year. The only excuse for this disturbance is the danger of exchang-

ing a good national administration for a bad one. The two great political parties have it within their power to prevent any interruption to business by selecting as their nominees men of high character and conservatism.

There is the additional danger that the radicals in Congress may cause depression in business, but if business is bad, it will be due to political rather than to economic reasons. If the volume of traffic for 1924 equals that of the current year,

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r-- and the present level of rates is not disturbed, the net earnings should be as good in 1924 as in 1923, and will doubtless still fall short of the fair rate of return fixed by the Interstate Commerce Commission.

Since their return to corporate management, the railways have made good progress in restoring their facilities and in upbuilding the morale of their employees. This having been accomplished, the most pressing problem in connection with transportation at the present time is, I think, a public sentiment that will free the railroads from threats of premature rate. reductions or other restrictive legislation.

Given this foundation, investment in railway securities will be encouraged and the carriers will be able to raise capital in sufficient sums to keep themselves provided with modern facilities. The installation of cost-reducing facilities will permit the reduction of operating expenses and thus bring about the lowest possible rates without impairing their ability to render adequate service.

# Business of 1924 Will Closely Approximate that of 1923

By L. W. Baldwin

President, Missouri Pacific

1. Considering the outlook in its many phases, I feel that as better confidence is being daily established, business for 1924 will approximate closely, if not exceed, that for 1923.

2. I do not anticipate that distribution of traffic will be materially different from that of 1923. Should a wide seasonal fluctuation occur, however, it is my opinion that with the additional equipment already available and the general improvement in transportation conditions, the railroads could handle promptly a reasonable increase of traffic in any particular season.

3. Our capital expenditures insofar as roadway is concerned will slightly exceed those of 1923, but insofar as equipment is concerned probably less.

4. Unquestionably, unfavorable legislation by Congress at this time and especially repeal of Section 15-A of the Transportation Act would create confusion and uncertainty and impair further improvement and expansion of railway

facilities. The fact is, the needed relief as contemplated has not resulted under rates allowed.

5. Compulsory consolidation of railroads by legislative act would work very great hardship on many railroads and could not be justified in my opinion. Sound economic consolidations such as are needed will be voluntarily effected by the carriers themselves provided, of course, the Interstate Commerce Commission will grant the needed authority. Railroads should be permitted to combine with those which will enable them to better serve the public interests and effect economies in operation.

6. I feel that the general plan adopted by the Western Executives Committee and such plans as are being worked out by individual railroads in the dissemination of full and frank outlines of the facts offer the best means of promoting a better understanding of the railway transportation situation by both the railway employees and the general public.

# Fair Dealing Will Win Confidence of Employees

By J. E. Gorman

President, Chicago, Rock Island & Pacific

1. I think the prospects for freight traffic for the first half of 1924 are good. During the second half I think we will have more fully developed the uncertainties of a presidential year.

From a passenger standpoint we are not warranted in prophesying substantial improvement. This is not, however, due to general business conditions—which are quite favorable—but because of the program for development of hard surface roads in our territory which brings about increased use of both private automobiles and bus lines in competition with our local service. The prospect for through passenger business is encouraging, and, all things considered, the general result should about equal the present year.

2. I do not think the distribution of traffic during 1924 will be of a largely uniform character as during 1923. On the Rock Island 1923 was most abnormal, first, on account of the slow movement of traffic during the first part of the year by reason of the strike of the shop crafts, and second, owing to the fact that the wheat movement during the last half of the year has been extremely backward on account of the dissatisfaction with prices on the part of the farmers. A similar factor to the first one is not likely to be present in 1924; as to the second factor, that is problematical, as no one knows how the farmer will regard 1924 prices.

3. During 1923 the Rock Island expended approximately \$20,000,000 for additions and betterments, and it is not thought that our appropriation for these improvements will be so great in 1924,—although business conditions will, of

course, largely govern the amount of such work.

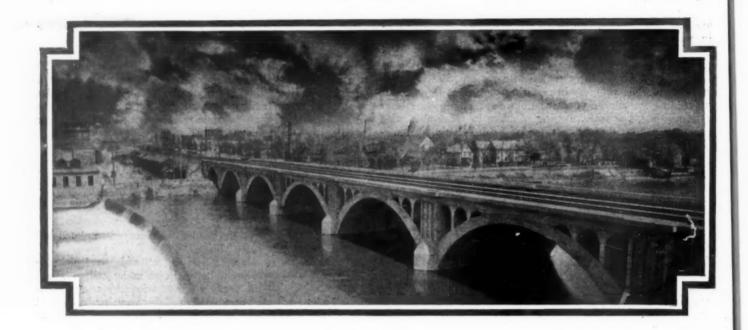
4. Any substantial modification of the Transportation
Act of 1920 would add very greatly to the present difficulties

of the railroads and would make it almost impossible for them to secure the necessary funds for improvements to roadway and equipment. The railroads when prosperous spend a great deal more money, probably, than any other single industry, and curtailment of their activities by changes in present legislation would not affect the railroads adversely, but would also affect the general prosperous condition of business.

I think the Transportation Act of 1920 should be left unchanged.

6. A constant and unremitting attention to all of those things calculated to encourage confidence toward the management on the part of employees, and a spirit of co-operation and teamwork, establishes a basis for public appreciation and support. Adherence to a policy of fair dealing with all employees is necessary. An effort to bring to the attention of employees the facts which are so much in public controversy, and the mutual interest of the employee and the management, will unquestionably be helpful in this direction.

At the same time, there should be continued effort to acquaint the public, by newspaper announcements and the distribution of carefully prepared material, as to the facts with respect to the transportation question, and the economic relationship between the railroads and the public. I am convinced that frequent meetings by railroad officials with civic organizations in the territory served, for the purpose of acquaintance, the presentation of facts and consideration of mutual relationships, are of material value. The recognition of our responsibility as public servants and an honest endeavor to discharge that duty on the part of all railroads will do much toward creating favorable comment.



# Railways Will Make Many Improvements in 1924

Work Already Authorized Indicates that Expenditures This Year Will Equal Those of 1923

By E. T. Howson

THE RAILWAYS of the United States and Canada spent over \$1,200,000,000 for additions and improvements to their properties in 1923. The indications are that they will spend an equal amount during the year now opening. This forecast is based upon the records of expendi-

tures made during the year which has just closed and a comparison between the work which is now definitely planned for prosecution during 1924 and that in prospect a year ago. The statistics regarding the expenditures made during 1923 were compiled from information furnished the Bureau of Railway Economics by the Class I roads of the United States, showing the amounts actually spent by them prior to October 1 and the additional amounts which they estimated that they would spend for improvements during the three closing months of the year. This aggregated \$1,075,-

897,940. Adding to this the expenditures which have been made by the Class II and the Class III roads of the United States and by the Canadian roads will bring the total above the figure of \$1,200,000,000 given above.

The forecast for 1924 is based on a comparison of the amounts already authorized or definitely planned for expenditure during 1924 with similar figures of a year ago. In our issue of January 6, 1923, we presented a summary of the information furnished us by 27 roads with an aggregate mileage of 95,000, showing that these roads planned

to make improvements and additions costing more than \$350,000,000. The assumption was then made that the remaining roads would spend at least an equal amount, on which basis it was estimated that the railways as a whole would spend more than \$700,000,000 during the year. The

conservation of this estimate is indicated by the fact that the actual expenditures, as indicated above, exceeded the estimated by more than 50 per cent.

This year we again asked the roads for information concerning their plans for the coming year, and 34 roads with a combined mileage of 109,415 gave us figures for the work which they have already authorized or definitely planned for 1924, which aggregate more than \$350,000,000, of which amount \$70,000,000 was carried over from 1923. The analysis prepared by the Bureau of Railway

Economics from data furnished by all of the Class I railways of the United States shows that over \$300,000,000 has been carried over into 1924 by all of these roads, indicating that the work now under way on those roads from which we have received no figures was much larger, in total and relatively, than on the roads for which our summary was prepared. Adding this \$230,000,000 carried over by roads other than those from which we have received reports to the \$350,000,000 for which we have reports indicates a total of \$580,000,000 definitely planned for expenditure during 1924 and forms the

STATISTICS received from 34 roads with 40 per cent of the mileage of the United States indicate that the railways will continue their improvement programs at approximately the same rate as in 1923.

Expenditures for additions and improvements to roadway and structures will receive a larger proportion of attention than in 1923 although large amounts are also set aside for equipment.

Expenditures designed to reduce operating costs will receive more attention this year.

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basis for the forecast that the expenditures which the railways will make during the year which is now opening will be as heavy as those during 1923.

The significance of these figures is apparent only if one realizes that the railways have spent more money for the improvement of their properties during the last year than during any year since 1911. The magnitude of last year's construction program was also emphasized by the fact that during only one other year of the last decade (1917) has the increase in property investment, as shown by the statistics of the Interstate Commerce Commission, exceeded \$700,000,000 and that the increase has averaged only \$500,000,000 during this period.

### Many Large Projects Authorized Late in 1923

An indication of the confidence with which the roads are viewing the future is indicated by the number of large projects which were authorized so late in 1923 that their completion will extend far into 1924 and many of them into 1925. Among these projects is the Natron cut-off of the Southern Pacific in southern Oregon, involving an expenditure of approximately \$18,000,000. The Atchison, Topeka & Santa Fe awarded contracts in December for additional buildings in its \$3,000,000 shop improvement program at San Bernardino. The Louisville & Nashville is pushing its second track program in eastern Kentucky vigorously and awarded a contract in December for 27 miles of additional construction involving very heavy work. The Pennsylvania announced in the closing weeks of the year that it is undertaking the construction of an icing station at Huntington, Pa., to cost nearly a million dollars, while the Philadelphia & Reading has continued to add to its extensive program of revision of terminal facilities in the vicinity of Philadelphia. The Southern Pacific of Mexico is now actively opening the construction of its 100-mile extension below Tepic, Mex., which is estimated to cost \$11,000,000, while the Illinois Central is making every effort to open the construction of its 175-mile alternate main line between Edgewood, Ill., and Fulton, Ky., which will cost over \$16,000,000. The fact that improvements of this magnitude are being undertaken at this time indicates that the managements of these roads feel that the outlook for the railways is favorable.

The most important adverse influence which is tending to retard the authorization of improvement work at this time is the uncertainty regarding the attitude of Congress and the program of the radical coterie whose hostility to the railways is well known. This condition is causing hesitation on the part of some executives as is evidenced by the reply from the president of a prominent road to our request for information, from which the following is quoted: "I have hesitated to authorize any extensive development program for the coming year in view of the uncertain state of affairs at Various measures calculated to injure the Washington. credit of the railroads have already been introduced and reports indicate that more are to come. If the advocates of government ownership, confiscatory freight rates and other schemes for hampering the carriers attain any degree of success, improvement programs will be practically valueless because of the financial difficulties that must follow such legislation. I think it is necessary to await further developments in Congress before making definite commitments except for such work as is absolutely necessary.'

## Budget Figures Are Necessarily Incomplete

Large as are the figures which have been quoted above, they are of necessity only partially complete, for they include only work which has been definitely planned for prosecution during 1924. Many roads, including large systems such as the New York Central, do not prepare budgets but consider each project individually as it is proposed at any

time during the year. In such cases our figures obviously include only that work which has already been approved, to the exclusion of much work which will be authorized and undertaken later in the year. The same condition prevails to a lesser extent on those roads which work on a budget, for new conditions arise during the year which make it advisable to undertake improvements not included in the budgets. It is this condition that caused the actual expenditures during 1923 to exceed our estimate of a year ago.

This money will go for all of those facilities which comprise a railway. It will provide new lines, multiple main tracks, new and enlarged yards, freight and passenger stations, locomotive terminals and their equipment, signaling and interlocking and cars and locomotives. It also includes large amounts for the strengthening and enlargement of the present facilities, such as the reconstruction of bridges, the laying of heavier rail and more ballast, the replacement of obsolete coaling and water stations with modern facilities, etc.

Of the amounts expended last year approximately twothirds went for equipment and one-third for improvement of the roadway and structures. This year indications point to a somewhat larger proportion for tracks and similar facilities, the percentages being practically reversed in the data provided us by the roads referred to.

### Desire to Secure Economy

The magnitude of the expenditures which the roads have made during the year which has just closed and the magnitude of those to which they are already committed for the year now opening, demonstrate the conclusion of railway officers that the railways can afford to spend large sums for the improvement of their properties. While the margin of safety was small at many points, the fact that the railways were able to handle the record-breaking traffic of the last year without congestion indicates that, in general, they have a capacity sufficient to meet the demands which may reasonably be expected. However, this does not indicate that they have the facilities which will enable them to handle the traffic with the maximum economy. It is the desire to reduce transportation costs as much as the necessity for increased capacity which is prompting these expenditures.

capacity which is prompting these expenditures.

The recent statement of C. H. Markham, president of the Illinois Central, to the effect that this road had been able to handle an increase of 94 per cent in traffic during the last 12 years with an increase of only 5 per cent in train miles and had thereby effected a saving of more than \$21,000,000 in transportation costs in 1922 as the result of an expenditure of more than \$225,000,000 for improved facilities, illustrates this point. The same point is borne out by the record of the Kansas City Southern which handled a traffic 121 per cent greater in 1922 than in 1905 with an actual decrease in freight train miles of 28 per cent, thereby effecting a saving in transportation costs of \$4,599,088 with an expenditure of \$18,000,000 in new money. It is significant that in general those roads which are now making the most favorable financial showings are those which have made the most liberal expenditures in the past.

### Heavy 1923 Business Reason for Large Budgets

The heavy business which has prevailed during 1923 and the indications that this will extend well into 1924 are in great measure responsible for the large budgets which are being authorized. The work during 1924, as in 1923, will be concentrated largely on certain roads while other roads will undertake only the immediate necessities. As is to be expected, those roads which are enjoying the largest degree of prosperity, such as the Southern Pacific, the Santa Fe, the Norfolk & Western, the Illinois Central and the New York Central, are making the most liberal expenditures, while other roads which are not sharing in the general pros-

perity to the same extent, such as those in New England and in the northwest, are proceeding with greater caution.

### The Roads Furnishing Information

The roads which have furnished information from which this analysis has been made include the following:

Alabama & Vicksburg . Atchison, Topeka & Santa Fe Atlantic Coast Line Boston & Maine Central of Georgia Central Railroad of New Jersey Chicago Great Western Cincinnati, Indianapolis & Louisville Chicago, Rock Island & Pacific Delaware & Hudson Delaware, Lackawanna & Western Denver & Salt Lake Elgin, Joliet & Eastern El Paso & Southwestern Florida East Coast Great Northern

Illinois Central Long Island Minneapolis, St. Paul & Sault Ste. Marie Missouri-Kansas-Texas Nashville, Chattanooga & St. Louis New York Central New York, New Haven & Hartford Norfolk & Western Northwestern Pacific Pennsylvania Philadelphia & Reading Richmond, Fredericksb'g & Potomac Southern Pacific, Pacific System St. Louis Southwestern Union Pacific

Vicksburg, Shreveport & Pacific

Western Pacific

### Numerous Roads Plan Large Expenditures

It is significant that in general the roads which were most active in making additions to their facilities during 1923 are continuing this program into 1924. Thus, in addition to carrying over approximately \$21,500,000 of work from 1923, the Santa Fe will spend approximately \$50,000,000 additional, or a total of more than \$70,000,000. This includes more than \$6,000,000 for second track, approximately \$6,000,000 for a bridge across the Mississippi river and \$22,000,000 for equipment. The Pennsylvania plans to spend more than \$50,000,000. While the New York Central System does not prepare a budget, it has carried over more than \$18,000,000 in unfinished work, including \$9,000,000 for the Castleton cut-off, which is not yet half completed and \$1,000,000 for a bridge across the Niagara river on the line of the Michigan Central which represents a total investment of nearly \$2,000,000.

The Illinois Central plans to spend more than \$45,000,000 in 1924, including \$10,000,000 on its Chicago terminal improvement project, more than \$6,000,000 for new lines, \$1,146,000 for bridges, \$1,000,000 for grade separation and \$1,389,000 for heavier track materials. It will also spend approximately \$10,400,000 for the rebuilding of equipment. In addition it has carried over \$8,000,000 unexpended from last year's appropriations to this account and \$3,400,000 for roadway improvements in which was \$1,580,000 for second

In addition to large expenditures made during 1923, the Southern Pacific plans to spend more than \$40,000,000 during this year, including approximately \$8,000,000 for new lines, \$5,900,000 for second track, \$2,900,000 for freight and passenger stations, \$1,500,000 for freight yards and \$12,500,000 for new equipment.

The Norfolk & Western contemplates improvements costing \$15,000,000, approximately half of which will go for equipment and the remainder for additions and improvements to its fixed facilities, including \$2,500,000 for additional main tracks, \$1,300,000 for shops and their equipment, \$1,100,000 for freight and passenger stations, \$1,000,000 for additional freight classification facilities and \$1,000,000 for signals.

The Union Pacific now has under way, or plans to undertake in the near future, work involving the expenditure of more than \$14,000,000, over \$8,000,000 of which will go for new lines, \$1,348,000 for bridges, \$800,000 for water and coaling stations and \$1,750,000 for new cars and locomotives.

Among other roads with more liberal budgets than usually have prevailed in recent years are the Rock Island and the Erie. The former plans to spend more than \$11,000,000, including \$3,200,000 for ballast and rail, \$1,082,000 for bridges and \$478,000 for second track. This road also plans to spend \$4,300,000 for equipment. The Eric contemplates additions to its roadway facilities aggregating more than \$5,000,000, including \$679,000 for additional main tracks, \$424,000 for classification yards, \$950,000 for shop facilities and \$100,000 for shop equipment, \$932,000 for grade crossing elimination and \$590,000 for new signaling.

### Several New Lines Will Be Built

While the railways of this country have definitely passed from the period of extensive development to that of intensive development, some important new lines are under consideration, although the two largest projects (those of the Southern Pacific and the Illinois Central) are designed primarily to reduce grades over which main line traffic will be detoured rather than to develop new areas. The longest and most expensive project which has been authorized is the Natron cut-off of the Southern Pacific, extending from Kirk, Ore., to Oakridge, a distance of 118 miles, and involving an expenditure of \$18,000,000. This line will provide an alternate route with lower grades than the present line over the Siskiyou mountains.

Scarcely second in magnitude to this, and similar in its general purpose, is the line which the Illinois Central has projected from Edgewood, Ill., to Fulton, Ky., crossing the Ohio river at Metropolis, Ill. The construction of this line was approved by the Interstate Commerce Commission last summer, but the awarding of contracts has been delayed because of the application for a rehearing of the protests of certain communities along the existing line in southern Illinois. It is expected that these difficulties will be cleared away so that work can begin on this line early in the spring. The sum of \$16,178,000 has been incorporated in the budget for expenditure on this work this year.

The Union Pacific will undertake the construction of a branch line from Rogerson, Idaho, south to Wells, Nev., a distance of 94 miles, early in the spring, for which line \$3,600,000 has been appropriated. This road also has under construction an additional main line through Boise, Idaho, 27.3 miles long, and an extension from Crane, Ore., west to Burns, 32 miles, which are estimated to cost \$4,380,000 Among extensions of lesser magnitude is one of 35 miles by the Florida East Coast which is estimated to cost \$1,090,000.

### Multiple Main Tracks Will Also Be Built

The need for additional main tracks to eliminate congestion and reduce delays is indicated by the fact that 12 roads report that they plan to build 268 miles of second and other multiple main tracks next year, involving an aggregate expenditure of more than \$20,000,000. The largest project of this character is on the Coast lines of the Atchison, Topeka & Santa Fe, where it is planned to spend approximately \$6,000,000 in the construction of 100 miles, thereby practically completing a two-track line from Chicago to southern The Southern Pacific contemplates an expenditure of \$5,900,000 for 29 miles of second track involving very heavy work in the Sierra Nevada mountains. The Atlantic Coast line will complete 57 miles of second track and will undertake the construction of 38 miles additional, involving a combined expenditure of \$1,400,000. The Norfolk & Western has appropriated \$2,500,000 for the construction of 20 miles of additional main track, while the Erie has appropriated \$679,000 for a similar mileage.

Other roads which contemplate the construction of additional main tracks include the Delaware, Lackawanna &

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Western which has set aside \$800,000 for 10 miles, the Chicago, Rock Island & Pacific with 10 miles costing \$478,000, the Great Northern with seven miles costing \$450,000 and the Elgin, Joliet & Eastern with three miles costing \$41,000

### Terminal Facilities Will Be Enlarged

That freight terminal facilities are deficient at many points is indicated by the fact that 15 roads plan to spend \$6,500,000 in improving conditions at 54 points. The Southern Pacific has set aside \$1,500,000 for improvements at eight points, while the Norfolk & Western has appropriated \$1,000,000 for increased facilities at two points and the New York, New Haven & Hartford a similar amount for distribution between four points. Among other roads which contemplate improvements to their freight classification facilities are the Long Island, which has appropriated \$955,000; the Erie, \$424,000; the Western Pacific, \$200,000 and the Elgin, Joliet & Eastern, \$188,000.

In addition to the large passenger terminals which are now being built by the Chicago Union Station Company and the Illinois Central at Chicago, by the Cleveland Union Depot Company at Cleveland and by the St. Paul Union Depot Company at St. Paul, 13 roads plan to spend over \$5,000,000 for the improvement of their individual facilities at 38 smaller points. The largest appropriation of this character which was reported is \$2,000,000 which the Southern Pacific will spend at eight points. The Illinois Central has appropriated \$730,000 to be spent at three points and the Norfolk & Western \$500,000 at one point. The Union Pacific has improvements aggregating \$746,600 under way at three points, and the Philadelphia & Reading at four points, involving an expenditure of \$307,000, while the Long Island has appropriated \$200,000 for improvements at three points and the Rock Island \$100,000 for facilities at two points.

### Freight Stations

Nine roads contemplate spending \$2,389,000 for freight stations at 19 points. Among these the Southern Pacific has appropriated \$900,000 for increased facilities at five points, while the Norfolk & Western will spend \$600,000 at two points, the Illinois Central \$380,000 at two points and the Chicago, Indianapolis & Louisville \$215,000 at one point.

An appreciation of the importance which modern terminal facilities for the care of cars and locomotives bear to efficient operation is indicated by the fact that 17 roads have authorized the expenditure of \$6,800,000 for the enlargement and improvement of facilities of this character. Of the roads reporting, the New York, New Haven & Hartford leads with an estimated expenditure of \$1,024,000 at seven points. Norfolk & Western is a close second with \$1,000,000 for facilities at two points, while the Erie will spend \$950,000 at six points. The Union Pacific is spending \$823,000 at seven points and the Southern Pacific will spend \$800,000 at 13 points. The Elgin, Joliet & Eastern has appropriated \$377,000 for improvements at three points and the Western Pacific \$256,000 at four points. The Long Island will spend \$250,000 at three points, the Chicago, Indianapolis & Louisville \$200,000 at one point; the Great Northern \$150,-000 at three points and the Northwestern Pacific \$100,000 at three points.

### Shop Tools and Equipment

In addition to these improvements 18 roads will spend more than \$2,600,000 for shop tools and equipment. The largest appropriation of this character has been made by the Illinois Central which has set aside \$700,000. Among other large allotments contemplated are those of the Norfolk & Western for \$300,000, the Southern Pacific for \$250,000,

the Philadelphia & Reading for \$243,000, the Union Pacific for \$184,000, the Chicago, Rock Island & Pacific for \$145,500 and the Delaware & Hudson and the Erie with \$100,000 each.

### Many Miscellaneous Improvements Will Be Made

Although train control is requiring a large part of the attention of signaling officers and will make serious inroads on the appropriations of this department on the 49 roads included in the Interstate Commerce Commission's order requiring the installation of equipment of this character on an engine district, eight roads have allotted \$3,675,000 for the construction of 1,043 miles of signaling. The Norfolk & Western will spend \$1,000,000 for facilities of this character on 107 miles of its line; the Philadelphia & Reading will spend \$728,000 on 94 miles of its line; the Erie \$590,000 on 134 miles of line; the Southern Pacific \$460,000 for 156 miles; the Great Northern \$450,000 on 200 miles and the Western Pacific \$225,000 on 180 miles.

In addition to work of the character above mentioned, 26 roads have apprepriated more than \$58,600,000 for miscellaneous improvements of a wide variety including the separation of grades, the reconstruction of bridges, the construction of additional water supplies, etc. The increasing congestion of traffic on the streets and highways is causing the roads to give special attention to the separation of grades. Reports received from nine roads indicate that they will spend more than \$5,000,000 for this purpose alone next year. Indicative of these heavy expenditures are the appropriations which the New York, New Haven & Hartford has made, aggregating \$1,800,000; the Illinois Central \$1,000,000; the Erie \$932,000 and the Great Northern aggregating \$500,000.

Among the larger appropriations for bridge work are those of the Santa Fe for a structure across the Mississippi river at Fort Madison, Iowa, involving an expenditure of approximately \$6,000,000; \$2,000,000 on the Florida East Coast; \$1,348,000 on the Union Pacific; \$1,082,000 by the Chicago, Rock Island & Pacific; \$1,146,000 on the Illinois Central and \$805,000 on the Philadelphia & Reading. Other individual projects of special importance include the tunnel which the State of Colorado is driving through the Continental Divide for the use of the Denver & Salt Lake, at an estimated cost of \$6,720,000, work on which was started late in 1923.

### Numerous Appropriations for Equipment

As indicated early in this article, indications point to smaller expenditures for equipment in 1924 than in 1923. This does not indicate that the expenditures to this account will not be large for the comparison is made with a year in which the number of cars placed in service is larger than any year since 1907. Indicative of the prospects for the year now opening is the fact that, in addition to orders already placed for equipment not yet delivered, 17 roads have already indicated their intention to purchase 177 locomotives, 17,000 freight cars and 500 passenger cars, involving the expenditure of \$63,000,000, while the Santa Fe indicates its expectation to spend approximately \$22,000,000 for equipment without giving details. Among the roads which have set aside large amounts for the purchase of locomotives are the Southern Pacific with \$3,800,000; the Delaware, Lackawanna & Western \$1,600,000; the Chicago, Rock Island & Pacific \$1,070,000; the Norfolk & Western \$1,000,-000; the Western Pacific \$806,000; the Philadelphia & Reading \$770,000; the Great Northern \$600,000 and the Missouri-Kansas-Texas \$570,000.

The appropriations for freight cars include \$6,700,000 by the Southern Pacific; \$6,000,000 by the Norfolk & Western; \$3,018,750 by the Chicago, Rock Island & Pacific; \$2,895,-

000 by the Philadelphia & Reading; \$2,660,000 by the Western Pacific; \$2,460,000 by the Missouri-Kansas-Texas; \$2,270,000 by the St. Louis Southwestern; \$1,650,000 by the Great Northern and \$1,000,000 by the El Paso & Southwestern.

### Passenger Cars

Among the roads which contemplate entering the market for relatively large numbers of passenger cars are the Southern Pacific with an appropriation of \$2,100,000; the Long Island \$2,000,000; the Union Pacific \$1,476,000; the Philadelphia & Reading \$1,168,000; the Missouri-Kansas-Texas \$500,000; the Minneapolis, St. Paul & Sault Ste. Marie \$475,000; the Central of Georgia \$412,500 and the Great Northern \$400,000.

In addition large amounts will be spent for the rebuilding of equipment, indicative of which is the allotment of \$9,500,-000 by the Illinois Central for the reconstruction of 4,200 freight cars and \$850,000 for the rebuilding of 19 locomotives.

That these estimates will be converted into purchases is indicated by the order placed by the Southern Pacific during the closing days of the year for 6,475 freight cars, one of the largest orders placed in recent years.

The above is not intended to present a complete review of the improvements contemplated by the railways of the United States and Canada during the year which is now opening or even to portray in full the work which will be done by those roads which have given us information concerning their plans. Rather it should be taken as indicative of the amount and character of the improvements which the railways are now planning and which they will undertake if the prospects continue bright for a reasonable business and their future is not endangered by radical legislation. What the railways need now is a respite from legislative interference and with this relief 1923 has indicated the rapidity with which they will respond to the demand for increased facilities and reduced costs of operation.

### Heavy Electric Traction

During the closing days of 1923 the Baltimore & Ohio announced its decision to electrify its Staten Island lines, as announced in the news columns of this issue. This will involve an expenditure of about \$6,000,000 and is not included in the total expenditures given in the early part of this article. This project includes all of the suburban passenger and all or a part of the freight traffic on the Baltimore & Ohio lines on Staten Island, New York. The type of equipment to be used has not yet been decided upon.

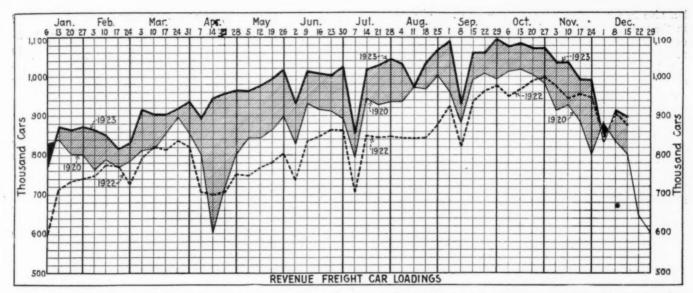
A contract involving the expenditure of \$15,000,000 for the electrification of 134 miles of the Virginian was let early in May, 1923. That part of this appropriation to be expended during 1924 is not included in the estimates made in the first part of this article. A heavy traffic consisting principally of coal is moved over this line, and after the electrification is complete the traffic will be handled by thirty-six 200-ton, 11,000-volt alternating current motive power units. From one to four units will constitute a locomotive and this arrangement will give them the distinction of being the world's heaviest and most powerful locomotives.

Of possibly equal importance is the electrification of the new Ford line, the Detroit & Ironton, to be operated in conjunction with the Detroit, Toledo & Ironton. About \$1,000,000 worth of equipment has been ordered for the electrification of 13¼ miles of line, and this is apparently only the first step in the consummation of a much more extensive plan. The locomotives to be used are of unique design. They will have 16 driving axles, will develop a drawbar pull of 108,000 lb. at 25 miles an hour, and will have a maximum speed of 45 miles an hour. The trolley will supply the locomotives with alternating current power at 22,000 volts.

If it becomes necessary for the New York Central to electrify all of its lines in New York City as provided in the Kaufmann Act, the cost of electrifying will probably exceed \$20,000,000.



New Canadian Pacific Tank Cars Have a Capacity of 12,000 U. S. Gallons



The Volume of 1923 Car Loadings Is Best Shown by Comparison with the Best Previous Year, 1920. Shaded Area Represents Weeks in Which 1923 Loadings Exceeded Those for Corresponding Weeks in 1920. Black Area, Weeks in Which 1920 Loadings Were Greater. Note that 1923 Loadings Were Greater for Nearly Every Week Shown.

# New Records for Transportation Performance

More Uniform Distribution of Traffic and Intensive Operation Enable Handling of Record Traffic

The RECORDS for transportation performance made by the railroads in the handling of the record traffic of 1923 have been announced with such frequency during the past few months that they have become almost

commonplace, and to obtain an adequate appreciation of the remarkable accomplishment it is necessary to go back and consider the situation as it existed early in the year.

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After the combined effects of the shop strike and the necessity for hauling most of a year's coal supply in a few months, as a result of the coal strike of 1922, had left the roads with an unusually large percentage of bad order equipment they found themselves faced, early in the spring, with prospects for a greater volume of traffic than ever before. From July, 1922, to March, 1923, they had already handled the greatest traffic ever transported in any corresponding period; there had been a large car shortage throughout the winter, which presaged an even greater shortage for the

fall season, when the crop and coal movements would be at their height; and a new Congress had been elected including many new members pledged to a revision or repeal of the Transportation Act, to which the roads were still looking for the fair return it was supposed to assure. Under these conditions the future looked anything but rosy at the time of the meetings of the American Railway Association and the Asso-

ciation of Railway Executives in New York on April 5, when the "Constructive Transportation Program for 1923" was adopted "in order to bring about the most effective cooperation between the managements of the several carriers

and to insure, to the highest degree practicable, adequate provision for the Country's transportation requirements."

It is no secret that some railroad officers were then rather skeptical of the possibility of carrying out all of the program that later turned out so successfully that the Interstate Commerce Commission in its annual report referred to the "hitherto unequaled transportation performance." some of the outstanding factors which had made this possible the commission mentioned (1) the condition of power and cars, (2) new locomotives and cars placed in service, and (3) increases in the miles per car per day and loading of equip-

After pledging themselves to do everything in their power not only to provide the neces-

sary equipment by repairs and additions, but to speed up car movement and to complete their own use of cars for fuel, maintenance and construction purposes as early in the season as possible in order that the equipment might be available for larger movement of seasonal commodities, the railroads on April 5 called upon the shippers for co-operation not only in the form of heavy loading and prompt release of cars,

THE YEAR 1923 was characterized by the uniformity of traffic. The peak figure of weekly car loadings—1,097,274 for the last week of September—was only 33 per cent above

During 1923 the weekly car loadings exceeded a million cars 21 times; in previous years these loadings had exceeded a million only seven times—five times in 1920 and twice in 1922.

that for the lowest week in the year.

The average daily movement of freight cars reached 30.7 miles in October; this figure had never before been reached in any month and was in excess of the goal set by the railroads.

The record-breaking traffic was handled practically without car shortage, congestion or embargoes of importance.

but also in a "ship early" campaign so as to move as early in the year as possible freight that would otherwise tend to cause congestion and car shortage at the time of peak demand in the fall. That such co-operation was extended by the shipping public and that it contributed materially to the ability of the roads to furnish adequate service throughout the year is demonstrated by the comparative uniformity of the volume in which freight was offered to the railways in 1923 as compared with other years.

Whereas the traffic curve for the year generally shows a marked rise from spring to fall, the density of traffic in October, 1923—5,803 net ton-miles per mile of road per day—was only 16 per cent greater than that for February, when it was 4,977. (For the ten months to October 31 the average density was 5,414 net ton-miles per mile of road per day.)

In 1922 the difference between the months of extreme low and high traffic density-in that year April and November-was 53 per cent. In 1920 the greatest variation was that between April, when the switchmen's strike had its greatest effect, and August, 44 per cent. While in previous years the number of cars loaded in a week had exceeded a million cars only seven times, five times in the fall of 1920 and twice in the fall of 1922, in 1923 the car loading reached the million mark in the week of May 26 and stayed above that point, with the exception of weeks which included a holiday, until November 10. During that period there were 21 weeks in which the loading exceeded a million cars and yet the highest figure for a single week was only 1,097,274 in the last week of September, representing a maximum fluctuation in that time of only 8 per cent. In fact, the peak figure for the year was only 33 per cent above that for the lowest week of the year, February 17.

### More Even Distribution of Traffic

The railroads have replied in the past to criticisms of car shortages by saying that they could not be expected to furnish enough cars promptly at all times unless they were allowed a return sufficient to maintain a large surplus of equipment in ordinary times, or unless the shipping habits of the people could be so changed as to distribute the freight more evenly throughout the year. The experiences of many shippers during 1920 and during the coal strike of 1922 had helped to drive the lesson home and with some additional support in the "ship early" campaign from the Department of Commerce and the Interstate Commerce Commission, the co-operation extended by the shipping public in 1923 was developed to a greater extent than ever before.

The construction industry, which in previous years had had considerable difficulty in its efforts to so organize its work as to bring about early shipment of materials, was particularly successful in taking advantage of the better car supply available in the early part of the year. The difficulties which many industries had experienced as a result of coal shortages in recent years led to an unusually early movement of coal in 1923, to such an extent that the coal movement in November, usually a heavy month, fell off so that the car loading for the week of December 2 was below that of the corresponding week of 1922 for the first time during the year

The railroads themselves set a good example by stocking their fuel coal early, and by October 1 had in storage 17,663,448 tons, of which 15,605,415 were in stock piles and only 2,058,033 in cars. Also by giving especial attention to the lake coal movement to the northwest the lake coal movement program was completed much earlier than in any previous season, thereby making available additional cars and locomotives for other commercial necessities during the fall and winter months. A new record was also established when 31,313,000 tons of coal were moved to Lake Erie ports for lake shipment during the season.

### Tonnage Per Car

Shippers also evidenced their co-operation by heavy loading of cars. The average carload for the 10 months to October 31 was 27 tons, as compared with 26.5 in 1922, but was less than that for the corresponding period of 1920, which was 29 tons. That heavy loading depends to some extent on the degree of car shortage is indicated by the fact that the average load fell off from 28.5 tons in July to 27 tons in October, whereas in several other years it has increased during those months. For October 22 the average was 27.7. The average load is also largely affected by the proportion of coal tonnage.

### New Records for Car Loading and Ton-Miles

Total freight car loading for 1923 is estimated at 49,844,000 cars, an increase of 15.4 per cent as compared with the loading for 1922 and of 10.5 per cent as compared with 1920, the previous record year. As compared with the war year 1918 the increase was nearly 12 per cent, and as compared with 1921 the increase was almost 27 per cent. The actual loading for the year to December 15 was 48,322;282 cars, as compared with 41,677,025 for the corresponding period of 1922, and by November 24, or in less than 11 months, the loading had exceeded that for the entire year of 1920, which was 45,118,863 cars.

The ton-mile figures show less of an increase over previous years than do the carloading figures, largely because of changes in the character of the traffic which affect the loading per car and the distance hauled, but they also show 1923 as a year of record-breaking traffic. The net ton-mile figures are available only for the first 10 months of the year. For that period they aggregated 386,918,000,000, an increase of 2.5 per cent as compared with the corresponding period of 1920 and of 28 per cent as compared with 1922. For October, the peak month, the net ton-miles were 42,209,-000,000, a figure which had been exceeded both in August and in October of 1920; the figures for June, July, August and September were less than for the corresponding months of 1920, and in some cases also below 1918. The fact that the year 1923 has been a record-breaker, therefore, is due to the comparative uniformity of the traffic throughout the year, which has also contributed to the ability of the roads to handle so great a volume satisfactorily.

The year 1920, which has heretofore represented the peak, was one of violent fluctuations. Following the coal strike of 1919, the switchmen's strike in the spring of 1920 resulted in an accumulation and congestion of traffic, and after this had been cleared up the heavy traffic of July, August, September and October was followed by the marked slump which lasted through 1921 and into 1922. Another period of heavy traffic began late in 1922, which has continued without interruption since, and whereas the ton-miles for June to October, 1923, have been slightly below those for 1920, the figures for the year are swelled by those for the earlier months and, as compared with 1920, will probably be further increased by those for November and December. If the ton-miles for those two months are only as great as for the corresponding month of last year, the total for the year will be 461,000,000,000 as compared with 449,-000,000,000 for 1920.

### New Record for Average Daily Car Movement

All previous records for the average daily movement of freight cars have been surpassed during 1923. The average mileage per car per day for the first 10 months was 27.9, an increase of 5 miles, as compared with 1922 and of 3 miles as compared with 1920. For October the average was 30.7 miles, a figure never before reached in any month, and in excess of the goal set by the railroads in their program.

The net ton-miles per car day in October reached the high figure of 550, as compared with 516 in October, 1922. For

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the 10 months the average was 517, as compared with 409 in 1922, and 393 in 1921. The net tons per train averaged 719 for the 10 months.

### Absence of Car Shortage

Undoubtedly the most remarkable feature of the year's performance was the fact that a record traffic was handled practically without car shortage, or congestion, or any embargoes of importance during the season of heaviest busi-There was an inheritance of car shortage from the year before, amounting to about 75,000 cars during January and February, and in February the accumulations of freight amounted to 63,000 cars. By May the shortage of 22,235 cars was exceeded by the surplus concurrently reported of 22,411 cars and by July the shortage had been reduced to 7,473 cars, while there was also a surplus of 76,110 cars. By April the accumulations were down to a normal figure, and since May there has been a continuous net surplus of cars. Although there were brief periods of shortage confined to certain localities, as at the time when there was a particularly heavy demand for refrigerator cars in the West, the lowest point the surplus reached during the fall was 23,895 cars during the middle of October. Since then there has been a gradual increase and for the second week in December the average surplus was 216,936 cars.

In August, 1920, when the traffic density was 44 per cent more than it was four months before, there was a net shortage at the end of the month of 145,000 cars, the largest on record up to that time. In October and November, 1922, when the volume of freight was 45 per cent greater than it was three months before, the net car shortage averaged 153,000 cars for eight consecutive weeks. It was not particularly to be wondered at that both railroad men and shippers looked forward with great apprehension to a year of continually increasing traffic after the peak of the year before had brought a record car shortage which persisted into the spring of 1923.

### New Cars and Locomotives

One of the first steps taken to meet the heavy business was the placing of large orders for cars and locomotives and other facilities in the fall of 1922. At the time the railroads adopted their program in April they had ordered since January 1, 1922, a total of 223,616 new freight cars, of which 117,280 had been delivered and 4,219 new locomotives, of which 2,106 had been delivered. They had expended in 1922 a total of \$440,000,000 for additional facilities and

had authorized similar expenditures for 1923 amounting to \$1,100,000,000. The actual expenditures for the year are now estimated at \$1,075,897,940. Up to December 1 they had put in service during the year 177,845 new freight cars, while 36,789 were still on order, and 2,704 new locomotives, while 739 additional were on order. The new freight cars included 70,206 box cars, 75,346 coal cars, 20,520 refrigerator cars and 4,857 stock cars. It will be noted that special attention was given to the acquisition of new coal and refrigerator cars, as to which complaints of shortage have been particularly acute in the last two or three years. While a large proportion of the new cars merely offset retirements without greatly increasing the total number of cars owned and, in fact, the figures include some old cars that were more than 50 per cent rebuilt, it is to be remembered that each new modern car at least replaced an old car that had been out of service awaiting retirement for some time and thus constituted a net addition to the railroads' capacity.

### Equipment Put in Condition

The intensive efforts to recondition equipment also played an important part in enabling the railroads to give a good account of themselves. Whereas on January 1 there were 7.2 per cent of the cars in need of heavy repair and 2.3 per cent in need of light repairs, by December 1 the percentage for heavy repairs had been reduced to 5.1 and the percentage for light repairs to 1.7. On January 1, 21.1 per cent of the locomotives were reported as in need of heavy repairs and 3 per cent in need of light repairs. By December 1 these percentages had been reduced to 14.9 and 1.5 respectively.

An important measure which contributed to the success with which the grain crop was handled was the issuance of orders effective on April 15 by the Car Service Division of the American Railway Association, under which over 100,000 box cars of western road ownership were delivered empty at Chicago, Peoria and St. Louis, and a large number were stored on western lines awaiting the grain movement, while western lines were not permitted to send eastern lines' box cars home except as loading was available.

Another development which assisted in making the year's performance possible was the organization by the Car Service Division of regional shippers' advisory boards as a medium of co-operation between carriers and shippers, for the purpose, among others, of anticipating car requirements and overcoming car service and operating difficulties which can be worked out locally.



A 50-Ton Gondola Built by the Newport News Shipbuilding & Dry Dock Co. for the Seaboard Air Line

# Capital Expenditures for Next Ten Years

## Analysis of Estimates of Expenditures for Increased Facilities to Meet the Expected Traffic Growth

A DDITIONS AND IMPROVEMENTS to locomotive and car equipment stand out prominently in the estimates of the railroads as to their oneeds for capital expenditures for facilities to enable them to handle the probable growth of traffic during the next 10 years.

An estimate that at least \$7,870,000,000 will be required by the railroads during that period for improvements and additional facilities to handle the expected increase in traffic was recently published by the Committee on Governmental Relations to Railroad Transportation appointed by the president of the Chamber of Commerce of the United States. The estimate was based on the results of a questionnaire sent to the railroads at the request of the committee by the Bureau of Railway Economics, which asked each road to furnish an estimate of the increase in physical facilities that would be required to handle a probable increase of 33-1/3 per cent in freight and 25 per cent in passenger traffic

An analysis of the questionnaires returned, for the purpose of ascertaining what they indicate as to the distribution of the estimated expenditures, shows that 43.1 per cent of the estimated expenditures is for additions and improvements

Locomotives: Additions Improvements	Eastern \$164,434,145 180,812,470	% 9.1 9.8	\$47,094,796 200,000	% 10.7 1.6	Western \$228,631,365 216,190,555	% 10.4 4.8	Total for Roads Reporting \$440,160,306 216,190,555	% 9.8 4.8	All Roads \$758,897,000 355,500,900
Freight Cars: Additions Improvements	329,904,025 36,984,585	18.0 2.0	102,354,476 250,000	23.8	492,436,970 76,233,243	22.4 3.4	924,695,471 113,467,828	20.6	1,594,302,500 195,634,200
Passenger Cars: Additions Improvements		3.4 1.9	20,550,524 50,000	4.8	71,672,401 11,946,590	3.2	154,264,891 47,589,104	3.4 1.0	265,973,900 82,050,200
Other Rolling Stock: Additions	22,360,559 4,286,000	1.2	3,057,365 10,000		17,246,315 1,082,220	.8	42,664,239 5,378,220	.9	73,559,000 9,272,800
Track, 1st Main: Additions Improvements	62,006,421 4,250,000	3.4	40,120,000	9.3	103,990,000 1,329,000	4.5	206,116,421 5,579,000	4.5	355,373,100 9,446,500
Track, 2nd or Other: Additions Improvements	188,793,502 500,000	10.2	35,727,500	8.3	157,835,120	7.2	382,356,122 500,000	8.5	659,234,700 862,100
Yard, Track or Sidings: Additions	\$81,439,896 2,481,328	4.2	\$14,698,510	3.4	\$106,851,144 500,000	4.8	\$202,989,550 2,981,328	4.5	\$349,981,900 5,140,200
Classification Yards: Additions Improvements	47,078,000 1,708,815	2.5	4,042,000	1.0	22,780,210 300,000	1.0	73,900,210 2,008,815	1.6	127,414,100 3,463,400
New Rail: Additions	15,121,700	8	759,110 12,815,000	3.0	5,500,000 28,325,324	1.3	6,259,110 56,262,024	1.2	10,791,600 97,003,500
Heavier Rail: Additions Improvements	2,366,500 25,504,349	.1 1.4	840,570 14,412,000	3.0	11,015,400 84,489,396	.5 3.8	14,222,470 124,405,745	2.7	24,521,500 214,492,600
Ties: Additions Improvements	834,000 28,991,250	1.6	210,000 7,000,000	1.6	1,044,000 44,745,000	2.0	1,044,000 80,736,250	1.8	1,800,000 139,200,400
Ballast: Additions Improvements	5,946,659 8,850,680	.3	3,010,000 320,000		23,797,754 49,712,561	2.2	23,797,754 54,883,241	1.2	41,030,600 94,626,200
Rail and Tie Fastenings: Additions Improvements	2,435,000 17,028,197	.1	1,310,000 2,250,000	.3 .5	2,952, <b>500</b> 34,979,719	1.6	6,697,500 54,257,916	1	11,547,400 93,548,100
Other Track Material: Additions	\$153,000 8,360,707		\$40,000 3,975,000	9	\$1,898,135 15,929,185	···.ż	<b>\$2,091,135</b> 28,264,892	6	\$3,605,400 48,725,600
Storehouses, wharves, docks, piers and elevators: Additions	31,535,430	1.7	57,000 2,055,000	5	12,229,900 15,832,170	.6 .7	43,822,330 20,212,453	1.	75,555,700 34,849,000
Improvements	2,325,283 18,393,150 28,705,927	1.	6,772,000	1.6	11,849.772 84,710,700	.5	30,242,922 120,188,627	2.6	52,142,900 207,221,900
Improvements	8,642,415 6,696,493	.5	4,292,960 949,000	1.	19,650,280 20,308,326	.9	32,585,655 27,953,819	.7	56,182,200 48,196,200
Improvements Shops and Enginehouses (including ma- chinery and tools):			42,547,000		83.594.807	3.8	172,629,407		297,636,900
Additions	46,487,600 28,632,255	2.6 1.6	6,000,000	9,9	53,936,916	2.4	88,569,171	2.	152,705,400
station and office equipment): Additions Improvements	52,669,612 24,152,800	2.9 1.3	249,000 8,743,00 <b>0</b>	2.0	20,587,640 25,487,800	1.1	73,506,252 58,383,600 Total for	1.6 1.3	126,734,900 100,661,400
Roadway Buildings (including roadway, machinery and tools): Additions	\$3,314,022 1,057,675	.2	\$271,450 3,315,000	···.;	\$8,929,110 5,417,365	.4	\$12,514,582 9,790,040	.3	\$21,576,800 16,879,400
Other additions and improvements:  Additions Improvements	111,500,146 130,270,881	6.0	3,512,000 45,047,000	.8 10.5	133,158,710 94,391,090	6. 4.6	248,170,856 269,708,971	5.5	427,880,800 465,015,500
Total\$1	,834,619,957		\$438,937,261		\$2,208,485,564		\$4,482,042,782 360,000.000		\$7,727,659,900
\$2	,694,619,957		\$438,937,261		\$2,208,485,564		\$5,342,042,782		\$7,973,000,000

Note-In some cases apparently the cost of track materials is included in the items of improvements and additions to trackage, while in others it is not.

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to equipment, while 28.9 per cent is for additional trackage and improvements to track, including yards, and 27.1 per cent is for structures, (including their equipment) and miscellaneous.

The distribution varies somewhat as might be expected, in the different parts of the country. The reports of the eastern roads show 45.6 per cent for equipment, while those of the southern roads show 40 per cent and those of the western roads 42.8 per cent. On the other hand the southern roads show a higher percentage for track and structures than the eastern or western roads.

On the basis of the reports of the 62 roads the main groups of estimated expenditures would be distributed according to the following percentages:

	East	South	West	Total
Equipment	45.6	40.	42.8	43.1
Track	26.7	32.4	31.2	28.9
Structures	26.9	28.5	26.8	27.1

The committee's estimate of \$7,870,000,000 was based on reports of 62 roads, operating 166,810 miles, or 64.6 per cent of the total, and handling 67.6 per cent of the total freight traffic in 1922. The committee expressed the opinion that, judging from the detailed character of most of the replies, they were generally computed with great care and that, compared with the mileage and traffic conditions on the lines from which no reports were received, the reports received were in fact representative of general conditions on the railways. The 62 roads reported the following expenditures:

															. \$3,609,754,982 . 1,712,377,644
Total	 			0 1	 		 			0	 	0	0	0.0	. \$5,322,132,626

Raising these figures to 100 per cent on the basis of freight business done, the reports representing 67.6 per cent of the total ton miles, the committee estimated the additional capital expenditure, based on present prices, that will be required by all railways in the United States during the next 10 years as follows:

														\$5,339,874,000 2,533,103,000
Grand	To	ı ês	1											\$7,872,977,000

On the basis of the proportion of the total reported by the roads in the east, south and west, respectively, this would be divided as follows:

Total								 																						\$7,873,000,000
Western		0	0	0			v	0		v	0	o	0	0	0	ø	0	0	0	0	0	0	0	0	0	0		0 0	, .	
Southern		0	9					0	0	0	0	0	0	0	0	9					0	0	0			0	0			709,000,000
Eastern					0	0	0															0		0	0					\$3,936,000,000

If raised to 100 per cent upon the basis of the mileage represented by the reports, 64.6 per cent, the figures for all roads would be:

Improveme	ent	ts	-		۰	9	۰			0	۰	0	۰					2,650,739,000
																		\$5,587,856,000

Three large eastern roads, operating 19,944 miles, gave only an estimate of total expenditures, amounting to \$860,000,000. While these figures therefore were used in making an estimate of total expenditures, they can not be included in a classification of the estimated expenditures. Some additional reports have since come in, however, and there are vailable for analysis the reports of 62 roads, operating 50,476 miles, or 58 per cent of the total. These include 19 astern roads, operating 31,274 miles, 9 southern roads, operating 15,938 miles, and 34 western roads operating 103,-74 miles. They also include 10 small roads that reported they could handle the increase in business without additional facilities.

The acompanying table shows the distribution of the estimated expenditures by items and as between eastern, southern and western roads, with the percentage of each item to the total. The total reported by the roads which gave detail figures is \$4,482,042,782, or at the rate of \$29,800 a mile, and includes \$1,834,619,957 for the 19 eastern roads, or at the rate of \$59,000 a mile, \$438,937,261 for the southern roads, or \$26,100 a mile, and \$2,208,485,564 or \$21,400 a mile for the western roads. The addition of the \$860,000,000 of unclassified expenditures, however, makes a total of \$5,342,042,782, or \$30,800 a mile, and changes the total for the eastern roads to \$2,794,619,957, equivalent to \$55,900 a mile.

The expenditures per mile are heavier in the eastern and southern districts as might be expected because of the greater density of traffic. The eastern roads report 50 per cent of the total expenditures, while their mileage is 25 per cent of the total and their freight traffic 45 per cent of the total. The southern roads report only 9 per cent of the total while

### NUMBER OF UNITS OF EQUIPMENT, TRACKAGE, ETC., RE-QUIRED IN NEXT TEN YEARS

	Eastern	Souther	n Wester	n Total	All Roads
Additional locomotives	2,742	893	3,887	7,522	13,200
Additional freight cars.	152,880	42,844	217,666	412,990	725,000
Additional pass. cars Add. 1st main track,	3,131	830	3,045	7,006	12,300
miles	574	677	2,136	3,387	5,950
track, miles Add. yard track and sid-	1,890	787	3,817	6,494	11,400
ings, miles	1,715	332	5,968	8,015	14,050
Total all track, miles	4,179	1,796	11,921	17,896	31,400
Class yards, number	34	8	66	108	172
New rail, tons		16,100	150,000	166,100	291,300
Heavier rail, tons	87,990	24,600	255,000	357,590	627,300
Ties, number1	2,001,840	920,000	48,242,000	61,163,840	107,304,900

their mileage is 19 per cent and their freight traffic 20 per cent of the total. However, the proportion of the southern roads that furnished the figures is less than in the case of the eastern or western roads. The western roads report 41 per cent of the total expenditures, while their mileage is 56 per cent of the total and their traffic 35 per cent of the total.

On the basis of mileage the committee showed that if all made expenditures in proportion they would add to their facilities during the next 10 years 5,950 miles of first main track, 11,400 miles of other main track, 21,000 miles of yard and side track, 13,200 locomotives, 725,000 freight cars and 12,300 passenger cars. As the committee has used the mileage basis in making these figures, the same basis has been used in the accompanying table which shows the number of units of each item reported, the totals, and the number which would be required by all roads on the same basis. The larger table shows the cost of the items for which the proposed expenditures would be made by the roads that classified their estimates, their distribution as between Eastern, Southern and Western groups, the percentage of the total expenditures for each item, and the total for all roads for each item if all made expenditures in like proportion.

Only a few of the roads gave any details of the estimated expenditures included under the head of "Other Additions and Improvements." Seven roads estimated \$35,950,000 under the head of additions for grade improvements and revision, and \$10,947,000 under the head of improvements. Seventeen roads listed a total of \$31,058,000 for additions and \$1,975,000 for improvements, under the head of signals and interlocking. Eight roads listed \$41,140,000 for additions and \$17,400,000 for improvements under the head of track elevation, grade crossings and separation of grades. One road listed \$9,500.000 for bridges. Two gave a total of \$25,300,000 for electrification and three listed a total of \$5,450,000 under the head of train control.



# Prices Maintain Uniform Levels During 1923

Sustained Demand and Freedom from Labor Disturbances Served to Stabilize the Material Market

By W. S. Lacher and E. L. Woodward

INETEEN TWENTY-THREE opened with all signs pointing to a prosperous year, yet the assurance engendered by this prospect was alloyed with no little concern on the part of producers and consumers alike. It was asked whether material prices would continue on the satisfactory

basis then prevailing, under which they not only insured favorable returns to the producer but also attracted business, or whether there would be a stampede as in 1920 when the scramble for deliveries terminated in the collapse of the unstable price structure which had been built up in consequence.

This had a wholesome effect. Buyers were more cautious. The sellers, also, under the leadership of the trade associations, urged caution and stabilization. Secretary Hoover's suggestion for the curtailment of public work had some effect, but even more potent was the influence of the Federal Reserve banks in discouraging credits on projects committed to highly inflated prices.

The maintenance of a high rate of production also had a favorable result, especially in the steel and cement industries, which established new records for output. A singular freedom from labor troubles was a helpful circumstance.

The net result of all these influences was a gradual tapering off of the upward trend of prices in the late spring, fol-

lowed by a period of practically level prices to the end of the year. As seen in the diagrams which accompany this review, the prices which prevailed generally throughout the last nine months of 1923 were definitely higher than those of 1921 or 1922, but not so high as those for the first part of 1920. The

one exception to this tendency is to be found in the coal market, which experienced marked reductions in prices.

N THE FACE of an upward trend of prices which had been in progress fully 10 months before the beginning of the new year it was clear that the top would be reached some time during 1923.

Could prices be maintained at the high level or must there be a peak followed by a recession, was the foremost question.

The outcome was most favorable for continued prosperity. After moderate increases, prices reached a crest late in the spring and most of them have been riding it successfully ever since, although the year closed with some tendency toward weakness.

### Iron and Steel

In no market was there more concern early in the year over the prospect of a runway market followed by a buyer's strike than in that of iron and s'eel, but efforts toward price stabilization had their influence and the upward trend flattened out in May and was followed by a record of unchanging prices that has had little precedent outside of the period of price fixing under the domination of the War Industries Board. For periods ranging from five to eight months the published quotations on finished materials were sustained

without variation in spite of fluctuations in demand for these

This situation is of particular interest because it is in contrast with that which prevailed with respect to pig iron and scrap, the prices of which have not only been subjected to considerable variation but also experienced marked reductions from the levels prevailing late in 1922 and during the first three months of 1923.

The price of rail did not deviate from the base of \$43 per gross ton established late in September, 1922. During the summer there were certain manifestations of a desire on the part of the mills to raise this price. One mill announced a premium of \$2 per ton for all rails weighing 110 lb. or more per yard, and it was rumored that other mills would follow this lead, but this project proved to be abortive since this dif-

### The Tie Market Runs Away

The history of the tie market is a story of recurring feasts and famines and the record of the past year was no exception to this rule, as a heavy demand for ties made it a seller's market until late in the year. This condition came about as a consequence of a gradual recovery extending throughout 1921 and 1922, from the slump in the market that followed the glut late in 1920. Owing to the fact that the railroads at that time practically discontinued the purchase of ties, the

DOUGLAS FIR	MILL 922	PRICE	S (ACT	UAL R	AILWA	Y PUR	HASES 1923	)				
Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.
Stringers, 8 by 16, 32 ft., No. 1 common\$22.00	\$22.00	\$24.00	\$26.00	\$27.00	\$28.00	\$29.00	\$28.00	\$28.00	\$28.00	\$28.00	\$28.00	\$28.00
Timbers, 12 by 12, 32 ft. and under, No. 1 common 20.00	20.00	22.00	24.00	25.00	26.00	26.00	25.00	25.00	25.00	25.00	25.00	25.00
Dimensions, 2 by 6 and 8, No. 1, common 19.00	19.00	21.00	22.00	23.00	23.00	23.00	19.00	17.00	19.00	19.00	19.00	19.00
Dimensions, 2 by 12, No. 1, common 20.00		22.00	23.00	24.00	24.00	24.00	20.00	19.00	20.00	20.00	20.00	20.00
Boards, 1 by 6, No. 1, common 20.50		22.00	23.00	23.00	23.50	23.50	20.00	19.00	19.50	19.00	19.00	20.00
Car framing, select common 26.00	27.00	29.00	29.00	29.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Car sills, 41-45 ft	31.00	33.00	34.00	34.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00	38.00
Car sills, No. 2, clear and better 58.00	58.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	50.00
Car lining, select common, D. & M	27.00	28.00	29.00	29.00	29.00	30.00	30.00	30.00	29.00	29.00	29.00	29.00
Car decking, finished, select common, D. & M 27.00	27.00	28.00	28.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00	29.00
Switch ties, common	18.00	20.00	23.00	25.00	25.00	25.00	25.00	24.00	24.00	24.00	24.00	24.00
Crossing rlank common 20.00	20.00	22.00	24.00	24.00	26.00	26.00	25.00	25.00	25.00	25.00	25.00	25.00

ferential was recalled a month later. Late in the summer some rumors were current of a prospective increase in the base price to \$47, but these were definitely allayed by the announcement in August that the \$43 base would apply to orders for 1924 delivery.

Taking into consideration all of the factors to be observed in the iron and steel market it may be said that the present tendency is moderately downward, a phenomenon that is probproduction was curtailed for such a long time that when the roads did come into the market in full force early in the past year the tie producers were not in a position to meet the demand.

The result was one of the worst scrambles for ties in many years. This had its most unfortunate effect in breaking down the enforcement of specification requirements. A marked tendency to accept ties as of grades to which they did not

SOU	THERN	PINE	MILL	PRICE	S (ACT	UAL RA	AILWAY	PURC	CHASES	5)				
1923	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
Stringers, 7 by 16, 28	45.00	\$55.00	\$70,00	\$70.00	\$70.00	\$70.00	\$70.00	\$70.00	\$72.00	\$72.00	\$76.00	\$76.00	\$76.00	\$76.00
Bridge material, 12 by 12, 22		45.00	44.00	44.00	44.00	44.00	44.00	44.00	46.00	46.00	50.00	50.00	50.00	50.00
Car sills, 36 ft. to 40 ft		46.00	42.00	42.00	42.00	42.00	42.00	42.00	44.00	44.00	48.00	48.00	48.00	48.00
Car lining	35.50	35.50	36.00	36.00	36.00	38.00	36.00	36.00	40.00	40.00	40.00	40.00	40.00	40.00
	62.00	62.00	58.00	58.00	58.00	60.00	58.00	58.00	62.00	62.00	65.00	65.00	65.00	65.00
Car desking, 2 in. 10 ft	27.00	34.00 38.00 43.00	34.00 38.00 39.00	34.00 38.00 39.00	34.00 38.00 39.00	34.00 38.00 39.00	36.00 38.00 39.00	36.00 38.00 39.00	38.00 40.00 41.00	38.00 40.00 41.00	38.00 44.00 43.00	38.00 44.00 43.00	38.00 44.00 43.00	38.00 44.00 43.00
2 by 4, 10 ft	31.00	31.00	29.00	29.00	29.00	31.00	31.00	31.00	33.00	33.00	33.00	33.00	33.00	33.00
	33.00	33.00	36.00	36.00	36.00	36.00	38.00	38. <b>00</b>	38.00	38.00	40.00	40.00	40.00	40.00

ably of a temporary nature, as the result of a seasonal curtailment of orders. There is no reason to anticipate any marked reduction from the present level of prices.

### Lumber

With 1923 a year of record building construction the lumber producers were most favorably situated. They, too,

conform made it doubly hard for those who endeavored either to sell or buy ties strictly in accord with the specifications. Because of this condition the price structure was very largely confused. What one road or another paid for its ties depended very largely on the understanding between buyer and seller as to the degree of conformity to specifications requirements that would be demanded.

1919		TMENT RANGE					19	23				
	Average		Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.
Western White Pine, No. 1, common, 6 to 8\$38.20 Hard Maple, No. 1, common. 47.17 Southern Red Cypress timbers, 1 by 4 to 12, No. 1,	\$53.64 84.34	\$53.54 48.73	\$53.71 65.00	\$53.30 59.25	\$52.74 62.33	\$54.17 63.43	\$47.42 63.20	\$47.00 61.56	\$46.25 72.50	\$45.67 64.00	\$42.90 58.67	\$44.08 60.77
Common 43.63 Douglas Fir. No. 1, common, 1 by 8, 1 by 10 23.50	63.62 26.97	40.34 16.14	20.60	42.20 21.31	45.66	43.00 22.67	46.00	44.00 21.20	44.40 20.00	44.81 20.40	44.25 20.64	44.30 21.11
Douglas Fir, No. 1, common, rough 12 by 12,           10-32 ft.         24.43           Southern Pine No. 1, common, 1 by 10	29.57 54.62 47.14	20.20 35.98 30.39	22.50 42.35 38.19	24.91 43.73 38.66	46.89 41.49	46.22 41.30	28.00 45.22 39.87	25.33 43.96 41.00	24.75 43.00 40.00	24.25 41.83 38.16	24.42 39.97 37.93	26.17 40.62 39.32

were fearful of the consequences of a runaway market and thanks to their efforts and other influences, the market exhibited unusual stability throughout the year. One factor was a shortage of building labor which served to curtail the consumption of lumber to a moderate degree and produced a dammed-up demand which later filled out the hollow spots at the tag end of the year. Prices were generally higher than at any time in either 1921 or 1922, but save in the case of a few items they were not as high as in the first half of 1920.

Of course, in any field in which the volume of production depends upon the number of men who can be persuaded to engage in it, any period of strong demand and high prices eventually develops an acceleration in production to the point that will meet the demand. This was the case with tie cutting during the past year. Production has caught up with the demand and the prices are falling. Already, published quotations to along right-of-way producers have been reduced 10 cents or more while quotations for off-line ties have been cut

26		19	RAII	LWAY A	GE		Vol. 76, 1	No. 1
estated promover								
- 1147 Th.		FR	EIGHT (	CAR PRICES	IN 1923 Unit	Total Approximate	Order Reported in Railway	Equip- ment Trust Ap- plication
Road Alabama Great Southern	No.	Type Hopper	Capacity 50-ton	Construction St. Fr.		Cost \$1,816,000	Age Mar. 10, 1923	Decided Apr. 2
Alabama Great Southern  Baltimore & Ohio	1,000 1,006 1,500 500 500 500 1,000 1,000	Box Coke Hopper Hopper Hopper Hopper Gondola Box	40-ton 70-ton 55-ton 55-ton 55-ton 55-ton 70-ton 40-ton	St. Fr. Steel	(See So. Ry.) 1,980  2,310  Am. C. & F. 1,784  Pressed Steel 1,774  Std. Steel, 1,769  Youngstown 1,642  and Ralston 1,650  Cambria 2,300  [Illinois Car and 2,069  Std. Steel 2,067	1,584,000 2,309,730 1,784,310 2,661,660 884,590 821,040 825,170 2,300,070 2,068,870 2,066,560	Jan. 6, 1923 Jan. 6, 1923	Apr. 2 Feb. 2 Feb. 2 Feb. 2 Feb. 2 Feb. 2 Feb. 2 Feb. 2 Feb. 2 Feb. 2
Baltimore & Ohio	500	Hopper Box	40-ton 55-ton 40-ton	Steel St. Und.	Pressed Steel 1,684 Am. C. & F 2,002	841,765 1,001,240 2,450,000	Nov. 10, 1923 Nov. 10, 1923	Dec. 13 Dec. 13 Dec. 13
Boston & Maine	1,000 200 300 100	Gondola Refrig. Flat Hart Convertible	70-ton 35-ton 55-ton 50-ton	Steel St. Und, St. Und, St. Und.	Cambria       2,450         Mer. Des. T. Co.       3,575         Magor       2,085         Am. C. & F.       3,210	715,000 625,500 321,000	Dec. 8, 1923 Apr. 21, 1923 Apr. 21, 1923 Apr. 21, 1923	June 15 June 15 June 15
Buffalo, Rochester & Pittsburgh		Caboose Air Dump	****	St. Fr.	Std. Steel 3,000 Clark 4,250	150,000 106,250	Feb. 10, 1923 Feb. 10, 1923	Mar. 6
Cambria & Indiana	1,000 500 100 200 300	Hopper Vent. Box Stock Gondola Hopper	55-ton 40-ton 40-ton 50-ton 50-ton	Steel St. Unf. St. Fr. St. Fr. Steel	Cambria         1,965           Chickasaw         Ship.         2,378           Chickasaw         Ship.         2,022           Chickasaw         Ship.         1,996           Chickasaw         Ship.         1,923           (1,000 Am. C. & F.)         C. & F.)	1,965,000 1,189,000 202,200 399,200 576,900	Mar. 24, 1923 Jan. 27, 1923 Jan. 27, 1923 Jan. 27, 1923 Jan. 27, 1923	May 23 May 19 May 19 May 19 May 19
Chesapeake & Ohio	800 800 200 40		70-ton 50-ton 50-ton 50-ton 10,000 g.	Steel Steel St. Unf. St. Unf. Steel	1,000 Am. C. & F.     2,500       1,000 Std. Steel     1,674       Pullman     1,674       General Am     1,919       General Am     2,550       Am. C. & F.     2,550	5,150,000 1,338,960 1,535,528 316,220 102,000	Mar. 24, 1923  Mar. 17, 1923	Apr. 20 July 20 July 20 July 20
Chicago & North Western	1,000 500 500	Box Box S. D. Stock D. D. Stock	40-ton 40-ton 40-ton 40-ton	St. Fr. St. Fr. St. Unf. St. Unf.	Western Steel, Gen'l 2,318 Am. and Am. C. 2,055 & F. 2,007 West. Steel	2,316,340 2,317,740 1,027,280 1,053,280	Jan. 13, 1923 Jan. 13, 1923 Jan. 13, 1923 Jan. 13, 1923	Dec. 17 Dec. 17 Dec. 17 Dec. 17 May 28
Chicago, Milwaukee & St. Paul	500	Auto	40-ton 40-ton	St. Unf. St. Unf.	West. Steel 2,073 General Am. 2,215 [1,000 West. S. C. & F.] 1,000 Pullman	4,145,160 1,107,370	Dec. 2, 1922 Dec. 2, 1922 Dec. 2 & 9, 1922	May 28 May 28
Chicago, Rock Island & Pacific	5,000 500 500 250 250	Gondola  Box Auto Coal Refrig, Flat	50-ton 40-ton 40-ton 50-ton 30-ton 50-ton	St. Fr. St. Fr. St. Fr. St. Unf. St. Unf.	3.000 Bettendorf Western Steel 2,200 Bettendorf 2,840 Am. C. & F. 2,445 Gen. American 3,558 Am. C. & F. 1,846	1,099,800 1,419,765 1,222,290 889,547 461,525	Nov. 18, 1922 Jan. 20, 1923 Jan. 20, 1923 Nov. 18, 1922 Jan. 20, 1923	May 17 May 17 May 17 May 17 May 17 May 17
Cincinnati, New Orleans & Texas Pacific Denver & Rio Grande Western	1,865	Hopper Gondola	50-ton 70-ton	Comp. Steel	1,365 Am. C. & F. 1,816 Western Steel 1,984	3,386,840 1,388,799 160,000	Mar. 10, 1923 Apr. 7, 1923	Apr. 2 Apr. 12 Apr. 12
East Jersey R. R. & Terminal	26 25	N. G. Stock Tank Tank	10,000 g. 10,000 g.	Steel Steel	Company shops 1,600 Am. C. & F 1,845 Am. C. & F 1,965	47,983 49,125		Jan. 25 Jan. 25
		Tank (with steam coils)		Steel	Am. C. & F 2,310	6,930		Jan. 25
Elgin, Joliet & Eastern	36 25 200 200 100 100 200	Tank Tank Gondola Gondola Gondola Hopper Hopper	10,000 g. 10,000 g. 70-ton 70-ton 70-ton 70-ton 70-ton	Steel Steel St. Unf. St. Unf. St. Unf. Steel Steel	Am. C. & F. 1,965 Am. C. & F. 2,055 200 Pullman 2,683 200 Std. Steel 2,684 Pressed Steel 2,692 Pressed Steel 2,848 Mt. Vernon 2,846	70,740 51,375 536,610 536,710 269,177 284,830 569,232	Feb. 24, 1923 Feb. 24, 1923 Feb. 24, 1923 Feb. 24, 1923 Feb. 24, 1923	Jan. 25 Jan. 25 July 24 July 24 July 24 July 24 July 24
Erie	1,000 1,000 2,000	Auto Box Gondola	40-ton 40-ton 70-ton	St. Fr. St. Fr. Steel	Baltimore C. & F 2,342 Pressed Steel 2,261 Std. Steel 2,708	5,415,420	Mar. 31, 1923 Mar. 31, 1923 Mar. 31, 1923	May 28 May 28 May 28
Florida East Coast	200 200	Flat Vent. Box	40-ton 40-ton	St. Unf. St. Unf. St. Unf.	Mt. Vernon	357,000 599,000	June 2, 1923 June 2, 1923 June 2, 1923	July 11 July 11 July 11
Great Northern	500 750 750 125 125	Caboose	40-ton 40-ton 75-ton 75-ton 12,500 g.	St. Fr. St. Fr. Steel Steel Steel St. Unf.	Pullman 2,423 Am. C. & F. 2,554 750 Cambria 2,177 750 Pressed Steel 2,144 Chickasaw 2,347 Am. C. & F. 3,245	2,422,950 1,277,200 1,632,562 1,608,247 293,437 405,589	Jan. 13, 1923 Jan. 13, 1923 Dec. 30, 1922 Dec. 30, 1922 Feb. 24, 1923 Feb. 3, 1923	Oct. 8 Oct. 8 Oct. 8 Oct. 8 May 16 May 16
	750 500 2,250	Gondola Gondola Gondola Gondola	50-ton 50-ton 50-ton	St. Unf. Comp. Comp. Comp.	Rodger Ballast 2,681  1,750 Pullman 750 General Am. 500 Bettendorf 500 Keith 2,302 2,303	1,340,500 1,740,375 1,151,100 5,182,875	Feb. 3, 1923 Feb. 3, 1923 Feb. 3, 1923 Feb. 3, 1923	May 16 May 16 May 16 May 16
Kansas City Southern	500	Box	40-ton	St. Fr.	Pa. Car Co 2,500	1,250,000	July 14, 1923	Oct. 10
Louisville & Nashville	500 500 2,000	Box Box	40-ton	St. Und. St. Und. Steel	500 Mt. Vernon 1,933 500 Chickasaw 1;954 Am. C. & F 1,831	966,600 977,175	Nov. 11, 1922 Nov. 11, 1922	Feb. 9 Feb. 9
Maine Central	2,300 50 350	Hopper Hopper Gondola Box	55-ton 50-ton 50-ton 40-ton	Steel Steel St. Und.	Pressed Steel 1,954 Std. Steel 2,250 Keith C. & M 2,250	3,662,540 4,493,418 112,500 787,500	Nov. 11, 1922 Mar. 24, 1923 Oct. 28, 1922 Oct. 28, 1922 Oct. 28, 1922	Sept. 14 May 2 May 2
Minn., St. Paul & S. S. Marie	100 500 500	Stock Box Box	40-ton 40-ton 40-ton	St. Und. St. Fr. St. Fr.	Keith C. & M	1,015,500 1,028,500	Nov. 4, 1922 Nov. 4, 1922	May 2 Jan. 31 Jan. 31
Mobile & Ohio	250 200 100	Gondola H. B. Coal Stock	50-ton 50-ton 40-ton	St. Fr. St. Unf. St. Unf.	Am. C. & F	492,032 354,200 188,600	Nov. 4, 1922 Feb. 10, 1923 Feb. 10, 1923	Jan. 31 Mar. 2 Mar. 2
New York Central	1,500 500	Box Hopper Hopper	40-ton 70-ton 70-ton	St. Fr. Steel Steel	Am. C. & F 1,926 Std. Steel 2,510 Pressed Steel 2,507	770,400 3,765,135 1,253,690	Feb. 10, 1923 Mar. 10, 1923 Mar. 10, 1923	Mar. 2 June 13 June 13
Michigan Central	2,000	Auto	50-ton	Steel	{1,500 Am. C. & F. } 2,769	5,538,085	Mar. 10, 1923	June 13
New York, Chicago & St. Louis	1,000 500	Refrig. Hopper Gendola	35-ton 55-ton 55-ton	St. Unf. St. Fr. St. Fr.	Mer. Des. 3,100 Pressed Steel 2,010 Std. Steel 2,250	6,200,000 2,010,000 1,125,000	Apr. 14, 1923 Feb. 17, 1923 Feb. 17, 1923	July 14 July 14
Norfolk & Western	1,000 1,000 500	Box Hopper Hopper	50-ton 70-ton 70-ton	St. Unf. Steel Steel	Ralsten	2,130,220 1,881,630 934,385	July 22, 1922 July 8, 1922 July 8, 1922	Mar. 31 Mar. 31 Mar. 31
Philadelphia & Reading	500 500 500 500	Hopper Hopper Hopper Hopper	70-ton 70-ton 70-ton 70-ton	Steel Steel Steel	1,000 Pressed Steel   1,897   Am. C. & F.,   2,072   Cambria,   2,135   Pressed Steel and   2,068	948,605 1,036,224 1,067,683 1,033,908	July 8, 1922 Feb. 18, 1922 Feb. 18, 1922 Feb. 18, 1922	Mar. 31 July 17 July 17 July 17
St. Louis Southwestern	500 200 200 <b>500</b>	Hart Convertible Auto Box	70-ton 50-ton 40-ton 40-ton	St. Unf. St. Unf. St. Unf.	[ Std. Steel       J       2,076         Rodger Ballast       2,523         Mt. Vernon       2,341         Am. C. & F       2,216	1,037,790 504,560 1,170,455 1,108,185	Feb. 18, 1922 Dec. 9, 1922 Dec. 9, 1922 Dec. 9, 1922	July 17 May 11 May 11 May 11

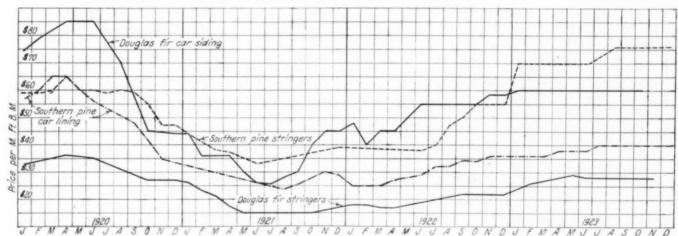
PRETCHE	CAD	DDICES	TNI	1023	Continued

	Road	No.	Туре	Capacity	Construction	Builder	Unit Price	Total Approximate Cost	Reported in Railway Age	ment Trust Application Decided	
Seaboard	Air Line	1,000	Vent. Box	40-ton	St. Fr.	Pressed Steel	2,450	2,450,000	Mar. 24, 1923	May 29	-
0000000		1,000 25	Gondola Caboose	50-ton	St. Fr. St. Unf.	{ 800 Std. Steel 200 Newport News Magor Mt. Vernon,	2,015 3,375	2,015,000 84,375	Mar. 24, 1923 May 19, 1923		
Southern		2,270	Box	40-ton	St. Fr.	Std. Steel and	1,980	4,494,602	Mar. 19, 1923	Apr. 2	
Southern	Pacific	200 2,000 500 3,700 350	Stock Box Stock Box Flat	40-ton 50-ton 40-ton 50-ton 50-ton	St. Unf. St. Unf. St. Unf. St. Unf. St. Unf.	General Am. Kilby C. & F. General Am. Pullman Std. Steel Ralston	1,777 1,843 1,998 2,300 1,663	355,400 3,686,200 999,000 8,508,375 581,900	Mar. 19, 1923 Apr. 29, 1922 Dec. 30, 1922 Dec. 30, 1922 Dec. 30, 1922	Dec. 8 Dec. 8 Dec. 8 Dec. 8	
		1,150	Gondola	50-ton 40-ton	St. Unf. St. Unf.	{ 575 General Am. } 575 Ralston } Company shops	2,252	2,589,250	Jan. 27 & Feb. 3, 1923 Feb. 3, 1923	Dec. 8	
		500 557	Logging Work	40-1011	St. Unf.	Mt. Vernon and Co. shops	2,800	1,559,775	Dec. 30, 1922, and Apr. 7, 1923	)	
Virginian		90 1,000 500	Caboose Gondola Hopper	120-ton 70-ton	St. Unf. Steel Steel	Company shops Pressed Steel St. Steel	5,000	278,475 5,000,000 1,477,500	Dec. 30, 1922 Apr. 21, 1923 Apr. 21, 1923	Dec. 8 June 4 June 4	

from 5 to 25 cents. The railroads have also accumulated good sized stocks and some now have their supplies of treatment ties for 1925 well in hand. Taken all together, the tie situation is now much easier than it was in the summer. If

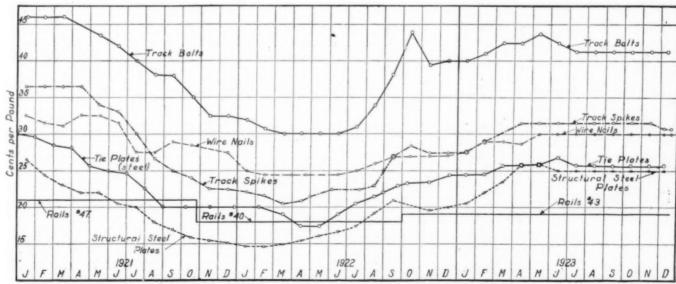
### Car and Locomotive Prices

In general, car and locomotive prices follow closely in trend the prices of basic commodities used in their construction and what is said about one can be said with equal truth



Price Range of Typical Lumber Items During the Last Three and One-Half Years

the railroads take advantage of this condition on a conservative, orderly basis, all well and good. If, on the other hand, they decide to stay out with the hope that the market will be depressed further and then all jump in at once, the scramble of 1923 will be repeated. about the other. Both commodity and equipment prices decreased from the 1920 peak until the early part of 1922 when a total reduction of 45 to 50 per cent in the price of cars and locomotives had been made. The pendulum then swung the other way and, under the stimulus of rising steel prices and a



Trend of Steel Prices on Items Applicable to Roadway and Structures

greater volume of orders, equipment prices increased. This increase continued through the remainder of 1922 and the first few months of 1923. For the balance of 1923 the prices remained fairly uniform at a level from 10 to 15 per cent higher than the average prices in 1922.

It is interesting to note that this higher level of prices during 1923 was maintained in spite of a substantial decrease in the amount of equipment ordered which would presumably

cause the manufacturers to bid against each other and thus depress prices. The fact of the matter is, however, that increased labor costs in conjunction with a somewhat higher level of material costs were responsible for the higher prices of cars and locomotives in 1923 as compared to 1922. There are no present indications of any considerable deviation from prices which held during the past year.

The 1923 equipment price levels are plainly shown in the

1 127.3.1		PASSENGE	R CAR P	PRICES IN 1923				Equip-
1 -		Con-				Total Ap-	Order Reported	ment Trust Ap-
1 N-		struc-	117-1-64	Dull I.	Unit	proximate	in Railway	plication
Read No. Alabama Great Southern 1	Class Dining	tion Length Steel 79 ft.	Weight 155,000	Builder Pullman	Price \$43,650	Cost \$43,650	Age Mar. 10, 1923	Decided Apr. 2
Baltimore & Ohio 2	Dining	Steel	138,400	Pullman	50,000	100,000	Jan. 27, 1923	Feb. 2
Buffalo, Roch. & Pittsburgh 7	Coaches Bagg. & Exp.	Steel 75 ft. Steel 69 ft.	125,700	Am C. & F Am C. & F	}	375,000	Feb. 10, 1923	Mar. 6
Central of Georgia	Bagg. & Mail Coaches	Steel 69 ft. Steel 79 ft.	126,850 137,500	Am. C. & F Pullman	29,590	59,180	Feb. 3, 1923	May 19
2	Compt. Coach Express	Steel 79 ft. Steel 74 ft.	140,000 131,500	Pullman	30,050 22,100	60,100 44,200	Feb. 3, 1923 Feb. 3, 1923	May 19
Central of New Jersey 55	Coaches	Steel 72 ft.	115,000	1 43 Am. C. & F. [	20,355	1,119,505	Oct. 21 and Nov.	May 19 May 21
45	Coaches Pass. & Bagg.	Steel 72 ft. Steel 72 ft.	115,000 115,200	155 Std. Steel 5	20,487 18,788	921,893 93,942	Oct. 21, 1923	May 21
10	Baggage Bagg. & Mail	Steel 72 ft.	136,200	Am. C. & F Am. C. & F Am. C. & F	16,981 25,304	169,813 75,913	Oct. 21, 1923 Jan. 27, 1923	May 21
Chicago & North Western 140	Milk Exp.	**** *****	149,800	Pullman	5,805	812,690	Jan. 13, 1923	May 21 July 20
40 10	Coaches Baggage	Steel 63 ft. Steel 64 ft.	114,100 117,400	Am. C. & F Am. C. & F	20,328 15,627	813,114 156,268	Nov. 11, 1922 Nov. 11, 1922	Dec. 17 Dec. 17
60	Milk Exp.		82,000	Pullman	5,797	347,815	Jan. 13, 1923 Nov. 25, 1922	Dec. 17
Chicago, Rock Island & Pacific 50 Cin., New Orleans & Tex. Pac 1	Suburban Dining	Steel 70 ft. Steel 79 ft.	155,000	Std. Steel Pullman	18,588 43,650	929,400 43,650	Mar. 10, 1923	May 17 Apr. 2
Florida East Coast 15	Baggage Dining	Steel 70 ft. Steel 73½ ft.		Pullman	23,000 50,000	345,000 50,000	May 26, 1923 May 26, 1923	July 11 July 11
	Mail	Steel 60 ft.	*****	Pullman Am. C. & F	29,000	58,000	May 26, 1923	July 11
Long Island 40 20	Motor Coach Trailer	Steel 64 ft. Steel 64 ft.		Am. C. & F	30,547 16,675	1,221,880 333,510	Dec. 16, 1922 Dec. 16, 1922	Sept. 13 Sept. 13
20 10	Coach	Steel 64 ft. Steel 64 ft.		Am. C. & F Am. C. & F	17,728 20,764	354,570 207,644	Dec. 16, 1922 Dec. 16, 1922	Sept. 13 Sept. 13
2	Bagg. & Mail	Steel 64 ft.	*****	Am. C. & F	20,340	40,680	Dec. 16, 1922	Sept. 13
Louisville & Nashville 14	Baggage Bagg. & Mail	Steel 73 ft. Steel 73 ft.	132,200 138,600	Pressed Steel	20,422 23,087	285,915 138,525	Apr. 7, 1923 Apr. 7, 1923 Apr. 7, 1923	Sept. 14 Sept. 14
4	Bagg. & Mail Coaches	Steel 73 ft. Steel 78 ft.	136,600 144,500	Pressed Steel Am. C. & F	22,647 28,950	90,59 <b>0</b> 289,504	Apr. 7, 1923 Apr. 28, 1923	Sept. 14 Sept. 14
5	Compt. Coach	Steel 78 ft.	144,800	Anf. C. & F	29,664	148,322	Apr. 7, 1923	Sept. 14
5	Coaches Compt. Coach	Steel 69 ft. Steel 69 ft.	119,000	Am. C. & F Am. C. & F	24,400 25,014	122,002 125,069	Apr. 7, 1923 Apr. 7, 1923	Sept. 14 Sept. 14
Maine Cantral 2	Dining Bagg. & Mail	Steel 82 ft. Steel 64 ft.	162,700 113,000	Am. C. & F Osg. Brad	47,500 22,000	95,000 154,000	Apr. 7, 1923 Oct. 23, 1922	Sept. 14
Maine Central	Bagg. & Mail	Steel 70 ft.	130,000	Am. C. & F	21,727	86,906	*********	May 2 Jan. 31
Missouri Pacific 8	Baggage Dining	Steel 70 ft. Steel 79 ft.	129,000 160,000	Am. C. & F Pullwan	19,009 47,266	76,037 378,124	Aug. 11, 1923	Jan. 31 Nov. 20
3	Café Club	Steel 77 ft. Steel 77 ft.	150,000 137,300	Pullman	45,517 30,073	136,550 120,294	Aug. 11, 1923 Aug. 11, 1923	Nov. 20
5	3 Compt. Coach 2 Compt. Coach	Steel 77 ft.	137,300	Pullman	29,203	146,017	Aug. 11, 1923	Nov. 20 Nov. 20
18 10	Coaches Baggage	Steel 77 ft. Steel 70 ft.	137,300 126,700	Pullman  Am. C. & F.  Am. C. & F.	27,732 20,581	499,172 205,814	Aug. 11, 1923 Aug. 11, 1923	Nov. 20 Nov. 20
10	Chair Chair	Steel 77 ft. Steel 77 ft.	132,000 132,000	Am. C. & F	29,798 29,482	297,978 58,963	Aug. 11, 1923 Aug. 11, 1923	Nov. 20
13	Suburban	Steel 73 ft.	110,000	Am. C. & F	22,685	294,904	Jan. 20, 1923	Nov. 20 Nov. 20
Mobile & Ohio 2	Pass. & Bagg. Coaches	Steel 69 ft. Steel 76 ft.	100,000 135,500	Am. C. & F Pullman	21,733 24,000	86,930 48,000	Jan. 20, 1923 Jan. 13, 1923	Nov. 20 Mar. 2
1	BaggExp. Bagg. & Mail	Steel 64 ft.	108,600 111,600	Pullman	15,100 19,900	15,100 19,900	Jan. 20, 1923 Feb. 3, 1923	Mar. 2
New York Central 35	Coaches	Steel 64 ft. Steel 78 ft.	134,000	Am. C. & F Pullman Std. Steel	28,554	999,387	Dec. 9 & 23, 1922	Mar. 2 June 13
5	Coaches Pass. & Bagg.	Steel 78 ft. Steel 75 ft.	132,000 127,300	Pressed Steel	28,650 26,942	143,250 134,709	Dec. 9 & 23, 1922 Dec. 9 & 23, 1922	June 13 June 13
3 10	Pass. & Bagg. Pass. & Bagg.	Steel 75 ft. Steel 69 ft.	127,300 129,000	Pressed Steel Std. Steel	26,827 40,750	134,135 407,500	Dec. 9 & 23, 1922 Dec. 9 & 23, 1922	June 13
.6	Motor Coach Baggage	Steel 63 ft.	111.000	Am. C. & F	19,340	116,037	Dec. 9 & 23, 1922 Dec. 9 & 23, 1922	June 13 June 13
20 75	Motor Coach Milk	Steel 69 ft. St. Unf. 52 ft.	129,000 82,000	Std. Steel M. D. T. Co	40,650 8,181	813,000 613,575	Jan. 13, 1923	June 13 June 13
For Boston & Albany 10	Coaches	Steel		**************	28,736 19,370	287,360 154,957	*******	June 13
5	Baggage Pass. & Bagg.	Steel	*****		26,826	134,132		June 13 June 13
Michigan Central 15	Coaches Baggage	Steel 79 ft. Steel 64 ft.	131,300 113,8 <del>0</del> 0	Am. C. & F	28,684 19,914	430,257 199,140	Dec. 9 & 23, 1922 Dec. 9 & 23, 1922	June 13 June 13
	Baggage Dining	Steel 64 ft. Steel 80 ft.	113,800 211,000	Std. Steel Am. C. & F. Am. C. & F. N. Y. C. shops. Am. C. & F. Am. C. & F.	19,814 47,000	158,512 141,000	Dec. 9 & 23, 1922 May 19, 1923	June 13
Cleve., Cinn., Chic. & St. L 20	Coaches	Steel 70 ft.	140,000	Am. C. & F	28,688	573,763	Dec. 9 & 23, 1922 Dec. 9 & 23, 1922	June 13 June 13
15	Baggage Pass. & Bagg.	Steel 61 ft. Steel 70 ft.	108,000 137,000	Tressed Steel	19,317 26,850	289,749 134,251	Dec. 9 & 23, 1922 Dec. 9 & 23, 1922 Dec. 9 & 23, 1922	June 13 June 13
6 2	Coaches Dining	Steel 70 ft. Steel 72½ ft.	140,000 165,600	Am. C. & F N. Y. C. shops	28,686 47,000	172,114 94,000	Dec. 9 & 23, 1922 May 19, 1923	June 13 June 13
				75 Pressed Steel 65 Am. C. & F.				
Pennsylvania190	Coaches	Steel 70 ft.	122,000	50 Std. Steel	20,739	3,940,410	Apr. 8, 1922	Apr. 2
35 25	Pass. & Bagg. Bagg. & Mail	Steel 70 ft. Steel 70 ft.	129,000 129,000	Bethlehem	19,260 17,421	674,095 435,537	Apr. 8, 1922 Apr. 8, 1922	Apr. 2 Apr. 2
Philadelphia & Reading 15	Coaches	Steel 72 ft.	109,000	Bethlehem	18,711	280,659	Feb. 18, 1922 Feb. 18, 1922	July 17
30 45	Coaches Suburban	Steel 72 ft.	109,000	Bethlehem	18,723 17,190	561,696 773,548	Dec. 23, 1922	July 17 July 17
5 5	Pass. & Bagg. Sub. P. & B.	Steel	*****	Bethlehem	17,551 16,702	87,755 83,511	Feb. 18, 1922 Dec. 23, 1922	July 17 July 17
Seeboard Air Line	Baggage Bagg, & Mail	Steel	*****	Bethlehem Am. C. & F Pressed Steel	17,242	86,208	July 22, 1922	July 17
Seaboard Air Line	Dining	Steel 79 ft.	155,000	Pullman	24,000 43,650	96,000 130,950	Apr. 21, 1923 Mar. 10, 1923	May 29 Apr. 2
Southern Pacific150	Motor Coaches Coaches	Steel	*****	*************	24,883 28,522	3,732,476 2,424,380	********	Dec. 8 Dec. 8
15	Baggage	Steel 70 ft. Steel 77 ft.	*****	Am. C. & F Pullman	21,529 48,300	322,940	Mar. 31, 1923 Mar. 31, 1923	Dec. 8
40	Dining Bagg, & Mail	Steel 70 ft.	*****	Std. Steel Am. C. & F	24,012	483,000 960,465	Mar. 31, 1923	Dec. 8
Union Pacific 18	Buff. & Bagg. Observation	Steel 75 ft. Steel 75 ft.	145,500	Pullman	46,487 45,054	743,792 810,972	July 14, 1923 Feb. 3, 1923	Dec. 8 May 3
· 21	Bagg. & Mail Dining	Steel 69 ft.	124,500 158,000	Std. Steel	21,357 49,987	448,501	Jan. 27, 1923	May 3
10	Baggage	Steel 83 ft. Steel 74 ft.	126,000	Puliman	21,700	499,890 217,000	Jan. 27, 1923 Feb. 3, 1923 Feb. 17, 1923	May 3 May 3

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### LOCOMOTIVE PRICES IN 1923

11.4			LOCON	MOTIVE PRICE	S IN 1923	11			_
Road Alabama Great Southern Baltimore & Ohio  Boston & Maine Buffalo, Rochester & Pittsburgh  Cambria & Indiana Central of Georgia  Central of New Jersey  Chicago & North Western  Chicago & North Western  Chicago, Milwaukee & St. Paul	50 25 50 10 10 10 5 14 29 4 10 10 5 56 5 20 25 25 26 6 40 10 13 12 18 2	Type 4-6-2 2-8-2 Electric 2-10-2 2-10-2 4-6-2 2-6-6-2 2-8-8-2 0-8-0 2-8-0 2-8-2 2-8-2 0-8-0 0-6-0 4-6-4 4-6-2 2-8-2 Lt. Mallet Hy. Mallet 4-8-2 2-8-2 4-6-2 2-8-2 2-8-2 4-6-2 2-8-2 3-8-2 3-8-2 3-8-2 3-8-2 3-8-2 3-8-2 3-8-2 3-8-2 3-8-2 3-8-2 3-8-2 3-8-2 3-8-2 3-8-2 3-8-2 3-8-2	Weight 299,000 327,400 436,000 436,000 436,000 253,000 241,200 241,200 300,500 300,500 300,500 319,000 291,600 293,400 342,500 441,000 352,000 312,000 294,000 294,000	Cylinders 27 x 28 26 x 32 30 x 32 30 x 32 30 x 32 29 x 32 24 x 28 23½ x 28 23½ x 28 24½ x 28 26 x 30 27 x 30 27 x 30 27 x 28 24 x 30 27 x 28 24 x 30 27 x 30 28 x 30 29 x 30 20 x 30	Builder American Baldwin General Elec. Baldwin Lima American American American American American	Unit Price \$57,500 54,870 69,575 77,001 77,350 66,250 53,600 43,750 73,200 84,900 51,850 54,400 39,100 39,100 37,770 55,275 59,000 72,750 96,725 61,200 51,305 54,305 55,430 55,504 35,504 35,504	Total Approximate Cost \$230,000 2,743,475 139,150 3,850,037 1,933,750 662,500 536,000 169,800 169,800 91,260 93,800 91,260 92,66,700 425,000 195,500 425,000 195,500 425,000 1,815,000 2,418,125 122,400 1,815,000 2,418,125 122,400 1,815,802 432,002 1,815,802 432,003 1,815,802 432,003 1,815,803 3,979,500	Railway Age Mar. 3, 1922 Oct. 21, 1922 Mar. 24, 1923 Mar. 24, 1923 Mar. 3, 1923 Feb. 10, 1923 Feb. 10, 1923 Feb. 10, 1923 Feb. 17, 1923 Jan. 27, 1923 Jan. 27, 1923 Jan. 27, 1923 Nov. 18, 1922 Joec. 16, 1922 Jan. 27, 1923 Nov. 18, 1922 Sept. 23, 1922 Sept. 23, 1922 Nov. 4, 1922 Sept. 23, 1922 Sept. 23, 1922 Sept. 23, 1922 Sept. 29, 1922 Sept. 9, 1923 Jan. 6, 1923	Equipment Trust Application Decided Apr. 2 Feb. 2 Feb. 2 Dec. 13 Dec. 13 June 15 June 16 Mar. 6 Mar. 6 Mar. 6 Mar. 6 May 23 May 19 May 19 May 19 May 19 May 21 Dec. 17 Dec. 17 Dec. 17 Dec. 17
* * * * * * * * * * * * * * * * * * * *		2-8-2	332,000	28 x 30	American	56,811	1,363,476	Oct. 21, 1922	May 28 May 17
Chicago, Rock Island & Pacific  Denver & Rio Grande Western	30 10 10	2-8-2 2-8-2 4-8-2 4-8-2 4-8-2 4-8-2 2-8-8-2	332,000 332,000 369,000 369,000 377,000 378,600 384,200 532,000	28 x 30 28 x 30 28 x 28 28 x 28 28 x 30 28 x 30 28 x 30 25 & 39 x 32	American American American American American American American	68,684 57,825 61,009 62,200 53,157 63,761 71,954 86,232	412,104 1,734,750 610,090 622,000 531,574 637,615 719,537 862,319	Oct. 21, 1922 Feb. 10, 1923 Oct. 21, 1922 Feb. 10, 1923 Dec. 9, 1922 Feb. 10, 1923 Feb. 10, 1923 Dec. 9, 1922	May 17 May 17 May 17 May 17 Apr. 12 Apr. 12 Apr. 12 Apr. 12
Elgin, Joliet & Eastern	10 1 4 5	N.g. 2-8-2 2-8-2 2-8-2 2-8-2 2-8-2	156,000 329,800 320,400 320,400 320,400	18 x 22 28 x 30 28 x 30 28 x 30 28 x 30	American American 9 American 5 Lima	34,500 66,201 57,301 57,551 56,824	345,000 66,201 229,206 287,757 284,119	Dec. 9, 1922 Mar. 3, 1923 Mar. 3 & 24	Apr. 12 July 24 July 24 July 24 July 24 July 24
Florida East Coast	15	4-8-2	285,000	25 x 28	American	57,200	888,000	Apr. 28, 1923	July 11
Great Northern	4	0-6-0 2-10-2	159,000 422,340	20 x 26 31 x 32	American Baldwin	34,250 85,639	171,250 342,555	Apr. 28, 1923 Mar. 3, 1923	July 11 Oct. 8
	21	2-10-2 2-10-2	422,340 422,340	31 x 32 31 x 32	Baldwin Baldwin	76,999 78,049	1,616,972 390,243	Mar. 3, 1923 Mar. 3, 1923	Oct. 8 Oct. 8 Oct. 8
Illinois Central	10 18 75 35 15	4-8-2 4-8-2 2-8-2 2-8-2 4-8-2	365,600 365,600 282,700 282,700 362,500	29 x 28 29 x 28 27 x 30 27 x 30 28 x 28	Baldwin Baldwin Lima Baldwin American	72,592 67,632 51,197 53,550 66,234	725,918 1,217,372 3,839,800 1,874,262 993,517	Mar. 3, 1923 Mar. 3, 1923 Nov. 4, 1922 Jan. 27, 1923 Jan. 27, 1923	Oct. 8 Oct. 8 May 16 May 16 May 16
Kansas City Southern Louisville & Nashville	10 30 12 8	2-8-8-0 Lt. 2-8-2 Hy. 2-8-2 4-6-2	500,000 295,000 320,000 277,000	26 & 41 x 32 26 x 30 27 x 32 25 x 28	American American American Baldwin	91,100 45,000 50,500 48,600	911,000 1,350,000 606,000 388,800	Apr. 28, 1923 Aug. 26, 1922 Sept. 9, 1922 Sept. 9, 1922	Oct. 10 Feb. 9 Feb. 9 Feb. 9
Louisville & Nashville	20	4-6-2 2-8-2	277,000 292,000	25 x 28 26 x 30	American American	51,361 49,788	308,168 995,751	Mar. 3, 1923 Mar. 3, 1923	Sept. 14 Sept. 14
Maine Central	10 8 6 2 10 5 5	2-8-2 4-6-0 4-6-2 0-8-0 2-8-2 2-8-2 2-8-2 2-8-2	340,000 185,000 271,000 203,640 332,900 332,900 332,900 332,900	27 x 32 20 x 28 25 x 26 24 x 28 27 x 32 27 x 32 27 x 32 27 x 32	American Lima American Baldwin American American American	53,187 37,252 46,600 40,500 68.888 68,712 60,638 60,463	531,876 298,016 279,600 81,000 688,876 343,563 303,188 906,939	Mar. 3, 1923 Oct. 23, 1922 Dec. 9, 1922 Apr. 7, 1923 May 12, 1923 May 12, 1923 May 12, 1923 May 12, 1923	Sept. 14 May 2 Jan. 31 Sept. 11 Nov. 20 Nov. 20 Nov. 20 Nov. 20
	5	2-8-2 4-6-2	332,900 316,600	27 x 32 27 x 28	American American	60,363 57,883	301,813 578,530	May 12, 1923 May 12, 1923	Nov. 20 Nov. 20
Mobile & Ohio	10	2-8-2 4-6-2	290,000 274,600	26 x 30 25 x 28	Lima Baldwin	49,500 50,200	495,000 150,600	Feb. 10, 1923 Feb. 10, 1923	Mar. 2 Mar. 2
N. York Central (for Boston & Albany) New York, Chicago & St. Louis	8 30	0-8-0 2-8-2	215,000 308,000	23½ x 30 26 x 30	Lima Lima	39,900 64,000	319,200 1,920.000	Apr. 14, 1923 Feb. 3, 1923	June 13 July 14
Norfolk & Western	12 30	4-6-2 4-8-2 2-8-8-2	252,000 352,000 531,000	22½ x 26 28 x 30 25 & 39 x 32	American American American	48,380 65,574 85,608	290,280 786,888 2,568,240	Jan. 27, 1923 Sept. 23, 1922 Sept. 23, 1922	July 14 Mar. 31 Mar. 31
Pennsylvania	475	2-10-0	386,100	30½ x 32	Baldwin	72,500	34,437,500 3	Sept. 23, 1922 00, Sept. 9, '22 75, Feb. 17, '23	Apr. 2
Philadelphia & ReadingSt. Louis Southwestern	25 15	2-8-0 2-8-0	315,585 243,775	27 x 32 25 x 30	Baldwin Baldwin	38,192 49,404 63,000	741,059	Mar. 3, 1923 Jan. 27, 1923	July 17 May 11
Seahoard Air Line	20 10 40	2-8-2 2-8-2 2-8-2	300,000 292,500 326,000	26 x 30 26 x 30 27 x 32	American American American	53,637	1,260.000 536,370	Mar. 24, 1923 Mar. 3, 1923	May 29 Apr. 2
Court Design	12	4-6-2	299,000	$27 \times 28$	American	56,266 56,419	2,250,640 677,028	Mar. 3, 1923 Mar. 3, 1923	Apr. 2 Apr. 2
Southern Pacific	84 15 10	Hvy. Frt. 4-6-2 Hvy. Pass.	*****			*82,881 *62,858 *79,340	6,962,019 942,867 793,400	Mar. 10, 1923 Oct. 27, 1923 Nov. 3, 1923	Dec. 8 Dec. 8 Dec. 8
	10	Electric	*****	******	2-Westinghouse 8-Co. shops	43,027	430,270	Nov. 3, 1923	Dec. 8 Dec. 8
Union Pacific	10 18	Tenders 2-10-2	370,200	ral. capacity 29½ x 30	Co. shops American	10,069 71,050	100,686 1,278,900	Jan. 6, 1923	Dec. 8 May 3
	15	2-10-2 2-10-2	370,200 370,200	29½ x 30 29½ x 30 29½ x 30 29½ x 30	Baldwin Baldwin	70,950 71,100	1,064,250 213,300	Jan. 6, 1923 Jan. 6, 1923	May 3 May 3
	37	2-10-2 2-8-8-0	370,200 494,500	29½ x 30 26 & 41 x 32 25 & 39 x 32	Lima American	71,462 84,200	2,644,094 421,000	Jan. 6, 1923 Jan. 6, 1923	May 3 May 3
VirginianWahash	15 14	2-8-8-2 2-8-2	531,000 335,000	27 x 32	American American	80,580 58.050	1,208,700 812,700	Jan. 20, 1923 Apr. 7, 1923	June 4 Aug. 6
	6	2-8-2 2-8-2	335,000 341,500	27 x 32 27 x 32	American American	60,500 66,300	695,000 397,800	Apr. 7, 1923 Apr. 7, 1923	Aug. 6
*Average unit price.	20	0-6-0	202,000	25 x 28	American	44,000	880,000	Apr. 7, 1923	Aug. 6

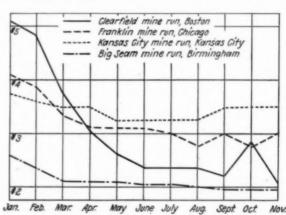
tables, the details regarding prices given in these tables having been obtained from I. C. C. finance dockets giving the railroads authority, required by Section 20-a of the Transportation Act, to issue equipment trust certificates.

### Car and Locomotive Material

The prices of several materials used in the construction and maintenance of cars and locomotives are shown on two of the charts which give a good idea of the trend of average

In general the price levels for these materials in 1923 were higher than in 1922 although there was a noticeable tendency for several of the materials to drop off in price in the latter part of the year. Journal bearings dropped from about 18.7 cents a pound in April to 14.3 cents in November, 1923. This was doubtless caused by the falling price of Lake copper which in alloyed form makes the base metal from which journal bearings are cast. It will be noted that the price of journal bearings closely parallels that of Lake copper for the entire period shown on the chart. Car axles, car wheels and brake shoes advanced slightly in price early in the year and held these price levels throughout November, the latest month for which figures are available.

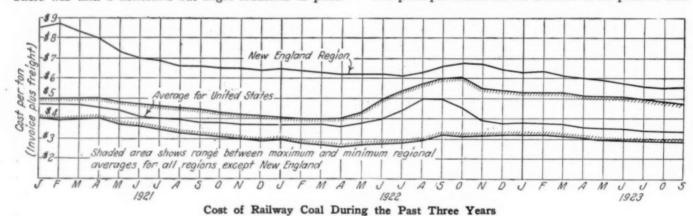
The prices of castings of all kinds used in car and locomotive construction also advanced in the first part of 1923 and held fairly uniform until September and October. There was then a noticeable but slight reduction in price. September, the latest month for which figures are available, coal prices in practically all regions of the United States were nearly at a minimum. For example, the September price in the New England region was \$5.50 a ton as against \$6.60 in



Trend of Spot Coal Prices During the Past Year

September, 1922, and \$8.80 in September, 1920. For the United States the average September price was \$3.15 a ton as against \$5.00 in the corresponding month of 1922.

The principal reason for the decrease in the price of bitu-

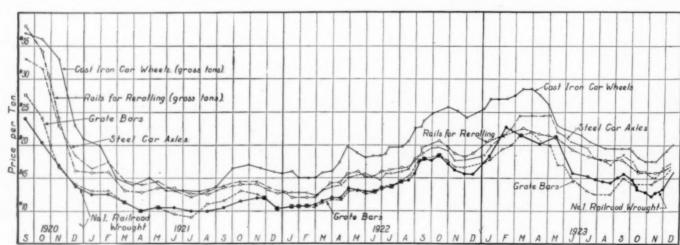


While this tendency as regards the price of steel and malleable iron castings may continue into 1924 no marked reduction is expected.

# is expected. Railway Coal Prices Down

There was a continued, though gradual, drop in the price of railway coal throughout the early months of 1923, and in

minous coal was the steady operation of the mines, uninterrupted by strikes, which resulted in almost a record production of coal for the year. The railroads were able to handle this large amount of coal promptly from mine to consumer; consequently, in spite of the large railroad and industrial demand for coal throughout the year, the supply exceeded the demand and the price gradually fell off. The excess coal



Scrap Prices Decreased During the Summer of 1923

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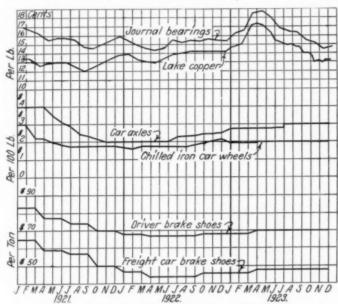
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production is also indicated by the fact that nearly 80,000,000 tons are in storage at the present time.

Referring to the chart showing railway coal prices for the years 1921, 1922 and 1923, it will be noted that the decline in prices was practically continuous from the peak prices caused by the coal strike in 1920 to September, 1923, with the exception of a period, roughly from May, 1922, to April, 1923, when there was also a coal strike, although less severe

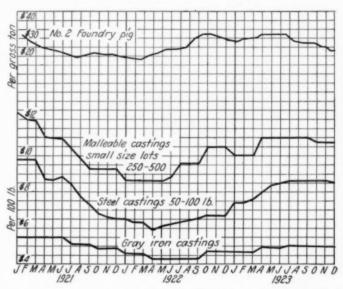


Price Tendencies for Typical Equipment Items

in its results than the strike of 1920. The comparatively high prices beginning with May, 1922, were also due to a heavy stocking program, both on the part of the railroads and other industries in anticipation of the strike which was known to be pending.

In general, the trend of railway coal prices is reflected in

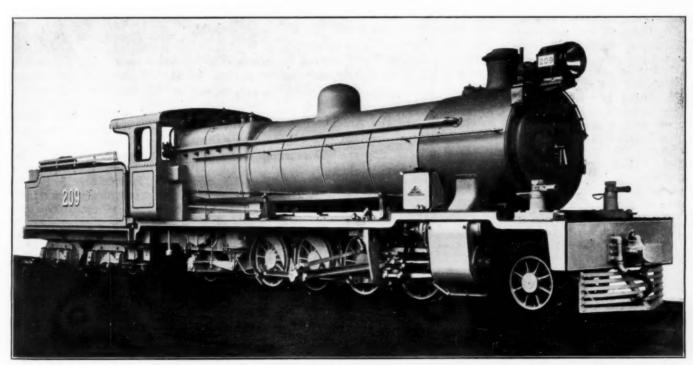
the chart showing the spot prices of bituminous coal. Spot prices fell off sharply from January to April, 1923, and then more gradually until August and September, when the operators imposed an artificial advance in anticipation of a de-



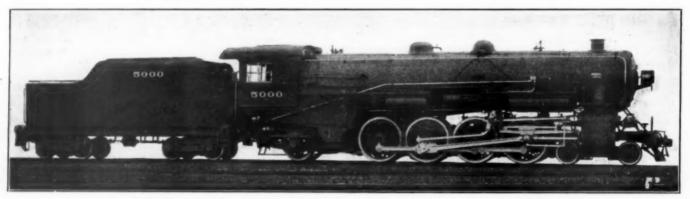
Range of Prices for Materials Used by the Mechanical Department

mand which normally takes place at about this time every year, but they were unable to hold prices at the higher level. This condition is particularly well illustrated in the curve showing Clearfield mine run, Boston, prices.

Since railway coal prices are now practically at rock bottom it is reasonable to expect a slight advance during the early months of 1924 and this advance may be accentuated, depending upon the severity of the weather and the possibility of labor difficulties in the coal industry in April, when a new agreement between the operators and miners must be signed.



This 2-8-2 Type Locomotive of 3 ft. 6 in. Gage Has 30,500 lb. Tractive Force. It Was Built by Nasmyth, Wilson & Co., Manchester, England, for the Gold Coast Railways, Africa



Three-Cylinder Simple Freight Locomotive, Built by the American Locomot've Company, in Service on the Lehigh Valley

# The Year's Tendencies in Equipment Design

Three-Cylinder Locomotives—More Powerful Motor Cars
—Individuality in Inside Finish of Diners

THE YEAR 1922 marked the beginning of a new era in the development of railway equipment. For many years prior to that time, the general trend of thought with respect to equipment problems had become conventionalized and the energy of the designer had been devoted largely to the intensive development of types, whose origin

was practically coincident with that of steam railway transportation. The year 1922 marked the practical culmination of a large amount of pioneering, particularly in Europe, where three types of turbine locomotives were running in experimental service and a number of units, including both locomotives and self-propelled cars, were developed employing internal combustion engines as prime movers.

When judged by the number of pioneer projects, culminating during its span, the past year is much less noteworthy than its predecessor, both in America and abroad. This, however, does not mean that a reaction has set in. In fact, the opposite is the case, and while the results have been less spectacular, there has, if anything, been an increase in

the seriousness of purpose with which the further development of these pioneer projects has been attacked.

### The Three-Cylinder Locomotive

Probably the most interesting single event in the motive power field in America is the reintroduction during the past year of the three-cylinder simple locomotive.

This is not a pioneer development in the same sense as is the turbine, or the internal combustion locomotive. Three-cylinder compound locomotives were built in England as many as 30 years ago. Owing to a marked tendency to slip the drivers which developed in these early designs, however, the type became unpopular and was abandoned. Later,

four cylinders, both compound and simple, came into favor where more than two cylinders were used.

If the three-cylinder type is not new in Europe, neither is it in America. About 14 years ago the Philadelphia & Reading built, and converted from two-cylinder simple locomotives, several Atlantic and 10-wheel, three-cylinder sim-

ple locomotives for passenger service. The journals on these engines, however, developed a marked tendency to overheat, which was difficult to control, and although those originally built remained in service for several years before being converted to the two-cylinder type, no more were ever built. Beyond the fact that they proved themselves capable of developing high speeds with the comparatively light trains for which they were designed, very little has ever been heard of them.

The three-cylinder locomotives now in service, one on the New York Central and the other on the Lehigh Valley, unlike their predecessors on the Philadelphia & Reading, have been designed for freight and not for passenger service. Here the advantage of the

more uniform torque produced by the three cylinders should permit an increase in drawbar pull of 14 or 15 per cent over that practicable from a two-cylinder locomotive with the same weight on drivers. The other apparent outstanding advantages of this type are the less severe loads on crank pins and frames because of the smaller driving units; better balancing, resulting partly from the reduced weights of reciprocating parts per cylinder and the better angular relation of the cranks of the three-cylinder as compared with that of the two-cylinder locomotive; and the better combustion conditions resulting from the softer and more frequent draft impulses, particularly when working hard at slow speeds.

Complete data are not yet available, from which to deter-

THE THREE-CYLINDER simple locomotive, first tried in America 14 years ago in fast passenger service and later abandoned, has been reintroduced for high capacity freight service.

Development of self-propelled passenger cars continues with the trend toward high power, high capacity units, and trailers.

Interest in the Diesel engine continues active, but the practical development of this type of motor as a railroad prime mover lies still in the

The effort of the American Railway Association to develop standard box car designs culminated this year, but their final adoption is still in doubt as the year closes. mine just how far these advantages have actually developed in service. Such observations as are available, however, indicate that they will be realized. The American Locomotive Company's experimental locomotive now in service on the Lehigh Valley, with a tractive effort of 64,700 lb. and a weight of 246,000 lb. on the drivers, on a number of trips has handled trains of more than 4,000 tons over a 94-mile district about one-third of which is ascending with frequently recurring ruling grades of 21 ft. per mile, in a running time of about four hours. On one of these trips the train load was 4,545 tons and the running time 4 hr. 8 min., with a fuel consumption of 12 tons, in which is included an additional 10 miles for the locomotive running light.

While the 50 per cent cut-off locomotive is not a development of the past year, it is worthy of note that it has become strongly intrenched on the Pennsylvania System, where it was developed. This road continues to increase in large numbers its freight power of this type, which offers advantages of uniform torque similar to the three-cylinder locomotive, with possibilities for marked fuel economy in slow and medium speed service.

### Rail Motor Cars

During the past year there has been a noticeable change in the trend of development of motor-driven passenger cars from that which characterized the early installations in the recent reintroduction of this type of equipment. At the outset the motor cars for railroad use were largely confined to adaptations of standard motor truck chasses. Aside from the special body, the use of a light four-wheel leading truck and the application of flanged steel tires, the equipment was very largely built along the lines of standard automobile practice. Although there was a field for this type of equipment, it soon became apparent that it could not meet the conditions imposed in many cases where the railroads were not only willing, but anxious to install self-propelled motor car service.

During the past year the tendency has been largely toward the development of units of greater carrying capacity, equipped with motors sufficiently powerful to maintain steam train schedules with the heavier cars, or when hauling a trailer. This has taken the development out of the strictly motor truck field and has called for considerable pioneering in the development of a satisfactory motor unit and transmission system. The present tendency is toward the use of double-end control, and there are at least three types of control and transmission for which double-end control has been developed. These are the hydraulic transmission, the mechanical transmission of the automobile type, with electropneumatic control, and the electric transmission and control.

One of the interesting developments of the year is the application of gasoline motors to standard railway coaches, using two motor units per coach. This depended on the successful development of a synchronous electro-pneumatic system of operating the mechanical transmissions of the two motors, one for each truck, which was accomplished by the Oneida Manufacturing Company in its installation on a Chicago & North Western coach.

In general, the tendency is away from the ready-made equipment, conforming largely to automobile standards, and in the direction of conformity to standard railroad practice in a constantly increasing degree in all parts of the equipment except the motor and transmission, which are the subjects of special development for this field.

Considerable attention has been given during the last two years in America as well as in Europe, to the possibilities of the Diesel engine as the prime mover both for self-propelled cars and locomotives. Its high thermal efficiency and the character of the fuel which it uses, makes it highly attractive for both these purposes. Its low torque at slow speeds and the comparatively large amount of energy required to start it, as well as its comparatively limited development in types of sufficiently high speed to bring the weight per horsepower within practicable limits for either service, are conditions which future development must overcome before dependence can be placed on this type of prime mover for railroad service. In the meantime high-power, high-speed gasoline engines, with the disadvantages of their short life and relatively high maintenance costs, must still be the mainstay of immediate developments involving the use of internal combustion motors.

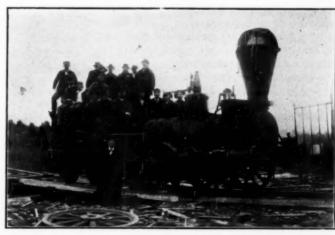
### Passenger Cars

The few outstanding developments in passenger car construction during the past year have had to do, not with the engineering features of the design, but with those features of arrangement and finish which affect the comfort and pleasure of the traveler. The Pullman Company has departed from the conventional type of arrangement of its sleeping car sections by the installation of semi-permanent and permanent headboards, both designed to increase the privacy and comfort of travelers in open-section cars.

A pleasing departure from the conventional standard interior finish, with which most recent passenger equipment has been characterized, was made by the Baltimore & Ohio in the interior of its so-called Colonial dining cars. In these cars the window design includes fan and side lights characteristic of the architecture of the Colonial period, and lighting fixtures in keeping with this treatment have been used.

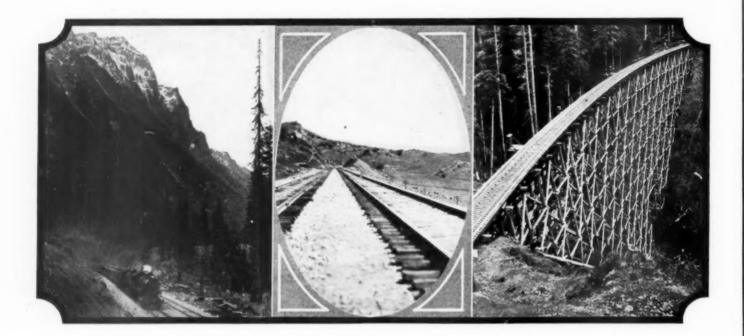
American architecture holds enough of pleasing effect in line, proportion and ornamentation to provide a wide range of individuality in finishing passenger equipment interiors, particularly those of club and dining cars, in a manner that may add an element of pleasure to travel on American railways that, with a few exceptions, has been lacking in the equipment built during the past 10 or 15 years.

The outstanding freight car development during the past year has been the culmination of effort of the American Railway Association toward the development of standard box car designs, in the report of the Mechanical Division Car Construction Committee at this year's convention. This report submitted proposed standard designs of single-sheathed composite and all-steel box cars. Following failure to secure the necessary two-thirds vote on the first letter ballot to which the designs were submitted, they are now again before the members of the Mechanical Division with slight modifications to meet the more important objections developing as a result of the first letter ballot, for their action a second time. What this action will be cannot be predicted. The letter ballot closes on January 19 and the result will be known shortly.



Keystone

The "Lion"-the Second Locomotive Used in Maine



# Railway Valuation Becomes Political Issue

Government Ownership Advocates Organize to Press Their Views; Statistical Work Nearing End

By E. T. Howson

THE OUTSTANDING development in the work of making the valuation of the railways during the year which has just closed was the attempt to substitute political methods for engineering and accounting procedure. After having been relegated into a more or less obscure posi-

tion for several years, the federal valuation work was suddenly thrust into the political arena during the summer.

With the bursting of the "guarantee" bubble of the radical group in Congress by the education of the public regarding the absence of any provisions of any kind for the reimbursement of the roads for any deficiencies in earnings and their inability as a group to earn what the commission had fixed as a fair return, even while handling the heaviest traffic on record, Senator La Follette and his coterie of "progressives" transferred their attention to valuation as offering a more fruitful subject for exploitation. Various charges

were hurled at the Interstate Commerce Commission, typical of which was the statement of Senator Brookhart that the valuation which the commission was making was \$7,000,-000,000 too high and that as a result the public would be required to pay more than \$500,000,000 annually in excess returns

This movement culminated in a gathering of 100 gov-

ernment cwnership advocates, including politicians and labor leaders, in Chicago last May to frame a platform which would make valuation a political issue. This group, led by Senator La Follette, who is the author of the law under which the federal valuation is now being made, formed an

THE OUTSTANDING DEVELOPMENTS in the valuation work during 1923 were as follows:

(1) Radical members of Congress threatened to make valuation political issue.

(2) Bureau of Valuation practically completed underlying engineering, accounting and land reports.

(3) The commission served the first final valuations on the properties of large carriers whose tentative valuations were contested.

(4) Field forces were organized to comply with that portion of the act requiring the valuations to be kept up to date.

organization which it termed the National Conference on Valuation of American Railroads in a two-day meeting behind closed doors. This organization charged the Interstate Commerce Commission with failing to comply with the requirements of the Valuation Act in, (1) not ascertaining the original cost of railroad properties; (2) not ascertaining the amount and value of public donations to the railroads, and (3) not reporting the methods whereby it arrives at the valuations fixed. This organization voted to demand of the commission that it comply with these "requirements of the act" and that in the event that the commission

failed to comply with this demand, the conference should "prosecute such legal proceedings as may be necessary to compel acquiescence."

In accordance with this action the conference filed a request with the commission in July, asking it to recommit to the Bureau of Valuation all proceedings now pending with instructions to report the original cost to date of rail-

road property and the amount and value of aids, gifts, grants of right-of-way or donations. The commission denied this petition early in December. What the next step will be has not been revealed, but it is evident that this group will endeavor to make valuation a political issue.

## The Statistical Work Has Proceeded Rapidly

Aside from this, the outstanding developments of the year have been, (1) the practical completion of the underlying engineering, accounting and land reports on which tentative valuations are based; (2) the serving by the commission of the first final valuations on the properties of large carriers whose tentative valuations were protested; and (3) the organization of field forces by the Bureau of Valuation to comply with that portion of the act requiring the valuation to be kept up to date. The progress in this work was set forth in detail by C. F. Staples, director of the Bureau of Valuation of the Interstate Commerce Commission, in an address before the annual meeting of the National Association of Railway and Utilities Commissioners at Miami, Fla., on December 4-7. This address is abstracted below.

As the number of tentative valuations served upon the roads has increased and the hearings on protests have proceeded accordingly, increasing dissatisfaction has arisen among the carriers because of the attitude assumed by the attorneys for the Bureau of Valuation in attempting to limit the evidence which the carriers could introduce in the hearings before the examiners. In other branches of its work the commission has followed a liberal policy relative to the admission into the record of evidence bearing on the question under consideration. In the valuation hearings, however, the attorneys of the bureau have taken a more technical attitude and have attempted to prevent the submission by the roads of much data bearing on their claims, but which fails to comply with the strict rules of evidence in legal proceedings. By this action the attorneys of the bureau have placed themselves more nearly in the position of defending their figures than of co-operating with the roads and other interested parties in the search for facts.

The carriers have been particularly desirous of learning the basis on which the Division of Valuation arrived at many of its conclusions, but the commission has opposed every attempt to bring out this information. The St. Louis Southwestern undertook to secure access to the records of the commission by mandamus, which attempt was unsuccessful in the lower court and is now before the Supreme Court of the United States for final decision. During the closing weeks of the year there were evidences that the commission realized that it should adopt a more liberal policy and the roads have been subjected to less technical objections in the introduction of testimony. In some cases the bureau has also begun to put on witnesses to support its contentions.

#### Commissioners Not Entirely United in Views

The outstanding feature of the first decisions of the commission fixing final value for large properties on which protests had been filed was the fact that the commission stated that it was finding values for rate-making purposes, although it was evident from the opinions filed by individual members of the commission in these cases that they are far from united in their views. It was also apparent that several members of the commission believe that other values may be found for use for other purposes. The close correspondence between these values and those in the tentative valuations of the bureau lead to the conclusion that the commission may be expected to make little revision in the tentative figures.

In comparing these final values for rate-making purposes, it should be borne in mind that they include only that property which is used for transportation purposes on the date of valuation and exclude much property owned by the railroads because it is not so used. This excludes not only lands

bought for future use, but grading for tracks not yet laid, etc.

In projecting the valuations which have been completed in tentative or final form for the purpose of arriving at an estimate of the total valuation of the railways, it should be borne in mind that many of the roads involving the most costly construction in the country, such as the New York Central, the Pennsylvania and the Baltimore & Ohio systems east of Buffalo and Pittsburgh, are not included. These roads not only include much of the two, three and four track mileage of the country, but they also contain large and valuable terminals which will be reflected in their valuations. Any projection of the valuations made to date on a mileage basis must make adequate allowance for these more expensive properties if it is to approach the final figures with any reasonable degree of accuracy.

As the more laborious work of preparing the inventory and assembling the data into the final reports is drawing to an end, it is interesting to note that the carriers and the government have spent nearly \$100,000,000 on this work since its inception in 1913. Of this amount the Interstate Commerce Commission expended \$24,559,956.28 up to June 30, 1923, while the appropriation for the fiscal year ending June 30, 1924, is \$1,250,000 and the commission has recommended that \$1,300,000 be expended the following year. The expenditures made by the Class I roads alone for this purpose amounted to \$70,487,905 up to June 30, 1923. In view of Senator La Follette's recent utterances on the subject of valuation, it is not out of place to call attention to his prediction on the floor of the Senate when the Valuation Act was under discussion to the effect that this would not cost the government more than \$2,400,000 and it would not cost the government and the railways more than \$5,-

## The Present Status of the Valuation Work

By C. F. Staples

Director, Bureau of Valuation, Interstate Commerce Commission, Washington, D. C.

The task devolving upon the Interstate Commerce Commission of valuing the properties owned or used by public service corporations in serving the public probably presents the most important and difficult economic problem ever undertaken by the government. It is required that a value be found for property representing an investment of many bil-lions of dollars. The property is privately owned. The funds for its construction have been supplied by private parties. These monies are invested with the hope of a return in the shape of interest or dividends, and so far as the funds have been honestly and prudently invested in a property needed to serve the public those who supplied them are entitled to a fair return for the use of their money. While the property is privately owned it is used in the service of the public. The public must have the service and can only ge it through the agency of these public service carriers. The business is distinctly a monopoly and, therefore, must be regulated by public authority. There is no doubt in my mind that the public is willing to pay the reasonable cost of the service.

To a large degree the commission is doing pioneer work. Although we have had public regulation since 1887, no clear-cut and definite rules have so far been laid down by either courts or commissions which may be used as a guide for fixing the value of common carrier property. This is evidenced by the fact that we have in our files 450 opinions written by the Law section of the commission regarding many questions raised involving doubt. We also have vol-

umes of advice in the shape of briefs presented by lawyers representing carriers, states and the commission.

The following table indicates the number and scope of the underlying reports on steam roads which have been completed:

	Number of Reports	Number of Corps	Miles of Road*	Per Cent of Total Mileage
Accounting as of Oct. 31, 1922	555	953	151,573	61.11
Accounting as of Oct. 31, 1923	903	1,474	223,444	90.09
Engineering as of Oct. 31, 1922	636	1,155	179,475	72.37
Engineering as of Oct. 31, 1923	912	1.516	223,411	90.24
Land as of Oct. 31, 1922	671	1.063	144,411	58.23
Land as of Oct. 31, 1923	1,051	1,522	219,426	88.47

\*Miles of first main and branch line mileage; no duplication for second or other main tracks or sidings.

The Engineering section has submitted reports covering all of the Western Union Telegraph property located on highways in 24 states and has submitted for the same company 105 reports on the lines of 370 railroad companies, aggregating 163,358 miles of pole lines. The company owns and operates 217,306 miles of pole lines, of which 210,550 miles are located on railway property. Much progress had been made with the property of the Pullman Company. No work has been done upon the properties of telephone, electric, express and pipe line carriers, nor has the commission undertaken to value intangible property up to the present time.

STATEMENT SHOWING STATUS OF TENTATIVE VALUATION REPORTS

	Tentative Valuation Reports	Number of Properties	Miles of Road
Served		468	54,974
With Division One of the commission awaiting service		262	31,818
Total completed		730 1,207	86,792 163,284
Total when completed	1,053	1,937	250,070

Of the 327 reports, comprising 54,974 miles, served, 127 reports comprising 3,530 miles have become final because of failure to file protest. Hearings on protests have been completed in 105 cases and 26 cases are set for hearing in the near future. In 15 cases hearings have been begun and continued to later dates. Final arguments have been heard in 33 cases and 67 cases have been submitted without arguments. During the past year the commission has issued two final reports covering two important cases, viz., the Atlanta, Birmingham & Atlantic Railroad Company and its subsidiaries, the Georgia Terminal Company and the Alabama Terminal Railroad Company, and the San Pedro, Los Angeles & Salt Lake Railroad Company. This may seem to be a small number of cases but it is a good beginning. The commission never undertook a job involving more work and questions more difficult to solve. In these two cases many principles involved in valuing common carrier property are determined. This does not mean that everybody is satisfied. The value found by the commission in the two cases above named are stated to be for "rate-making purposes."

When the primary or original valuation work was undertaken, it was necessary first to outline a plan for doing the work and to map out a program to be followed. The first step was to create a proper organization to do the field and office work. The organization created consisted of an Administrative section and three divisions styled, Land, Engineering and Accounting. The field parties had to be properly located in order to carry on the work of inventorying the carrier property concurrently in the different sections of the country. To accomplish this, five district offices were established. In order to have the inventory as nearly accurate as possible and also to determine the condition of the property, it was necessary to have the inventory made at a time as mear to the date of valuation of the property as it could be

made. The program made up and actually carried out is as follows:

Date o																Number of Properties	Roadway Miles	Years to the common date of valuation, assuming that to be 1922
1914							 									71	7.000	8
1915							 					9				185	38,000	7
1916							 									475	61,000	6
1917							 									478	62,000	5
1918																548	62,000	4
1919																210	19,000	3
1920		0 1														6	200	2
1921																3	200	1
1922		0 1			9											1	16	
	To	ta	ıls	8		0	0	9	9	 					0	1,977	249,416	

Because of the scarcity of help during the war, the carriers were excused from making reports to the commission. To a large degree, they took this as license to suspend the office work required by Order No. 3. As a result we received few reports prior to July, 1919. It was soon found that the carriers had to be educated up to the requirements of the order. A small number of men were put in the field o police the work in 1919. The force was entirely inadequate and in July, 1921, owing to a lack of funds, all men were withdrawn from the field and the office force was reduced from 16 to 6 people. This meant that the work was practically suspended. It was found futile to undertake to meet the requirements of the order by means of correspondence.

The enactment of Sections 15a and 20a of the Transportation Act and the creation of the Bureau of Finance, by the commission, resulted in calls for average values for recapture of excess earnings and values for the regulation of security issues by railroads. Thus, new life was brought into Order No. 3 work and a beginning was made to build up a proper force for its administration. We now have a force of 49 people, of which 17 are on duty in the field. It is our purpose to build the force up to the required number as funds are granted. We should have no less than 50 people in the field and the necessary office force to do the work required. The field force is composed of land men, engineers and accountants and all must be experts. The work of policing the carriers' return is of vital importance. This part of the valuation work is never ending.

Up to the present time the number of projects reported upon is 400,000, showing costs of about \$3,500,000,000. Of these, 3,000 miles of road, covering 61 properties, have been checked in the field and the office work done. The costs reported for these 61 properties aggregate \$50,000,000. The work of the field force to October 31, 1923, covered the reports and records on 140 roads, aggregating 11,000 miles, and shows changes costing \$185,000,000. This field work cost \$4.30 per mile.

It is expected that by January 1, the field forces will have completed their examination of 150 carriers, comprising 12,000 miles with property changes aggregating \$200,000,000, and that the office force will have completed the examination of verified returns and rendered reports of average values upon the properties of 100 companies.

#### Bringing Valuations Down to Date

A valuation of common carrier property once made must be brought down to date from time to time in order to make it of practical use. If this is not done, the cost of doing the initial work might better have been saved.

Congress, having this fact in mind, incorporated a provision in the fifth paragraph of the Valuation Act which reads in part as follows:

"Upon the completion of the valuation herein provided for, the commission has thereafter in like manner to keep itself informed of all extensions and improvements or other mon e of ation, ming at : 1922

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changes in the condition and value thereof, and shall from time to time revise and correct its valuations \* \* \* etc."

Anticipating the purpose to bring the original valuations down to date by corrections, the commission promulgated what is known as order No. 3, effective July, 1914. It was found that this order did not provide for sufficient detail and it was revised, effective July, 1917. Under the order as revised all carriers were required to report to the commission certain information, including a copy of each completion report, showing each unit and its costs in detail for every project, both for additions and for deductions. requirement was found to be too burdensome both for the carriers and the commission and effective January, 1919, the second revised issue of Order No. 3 was promulgated. Effective July, 1920, Supplement No. 1 was issued, designed to cover changes made in non-carrier property. Under the second revised issue carriers are required to maintain certain records showing units and costs that enter into changes in physical property, construction of new property and improvements of existing property for both additions and deductions. In addition to the above requirements, the carriers are called upon to make up and keep on file completion reports covering each project involving a change in its property. The carriers are required to file with the commission, semi-annually, lists of all completion reports and to supply upon request copies of the completion reports.

Carriers are required to make annual reports to the commission showing the actual cost of all changes in their common carrier property, covering both additions and deduc-These costs must be classified by primary accounts and grouped by valuation sections and by states. The costs reported represent the original cost to create the property, not the cost to acquire completed property through purchase, Lists of units are merger, consolidation or reorganization. not required to be furnished unless called for. It will thus be seen that a compliance with the order furnishes to the commission, in proper detail, a complete statement of the original cost of all changes made in carrier property subsequent to date of valuation. Reference to the table stating the properties valued as of dates 1914 to 1922, inclusive, will show the miles and years for which original cost statements must be made. The cost data thus obtained, when verified, is available and may be used in connection with bringing the original valuation down to date.

What I am about to say is not intended to reflect the views of the commission. Having the courage of my convictions, I have no hesitancy in stating how I think valuations should be brought down to a given date. I have transmitted to the commission with the suggestion that it be incorporated in the annual report a proposed recommendation to Congress of which the following is a copy:

"It is recommended that Congress enact legislation which shall provide that when the commission shall establish a final value on the property of the carrier as of a given date, this value may be corrected from time to time as the needs of the commission may require, by taking into account the net changes made in the property of the carrier on an actual cost basis between the date of valuation and the date as of which the valuation is to be corrected; the net increase or decrease to be added to or deducted from the original value established as of date of valuation as the facts may warrant, the corrected valuation to be used as prima facie evidence of the value of the carrier's property as of the date specified, said value figure to be used by the commission in any procedure involving the value of the property of the carrier.

Constitutional questions will be raised by lawyers. These I brush aside, not as having no force but rather because I believe we must find a sane and practical method for correcting valuations. I feel sure that all will agree that the present method is slow and cumbersome. The results would

be most unsatisfactory because the values when wanted for

use will not be available.
"In like manner," would require us to secure from the various carriers complete lists of units reflecting all changes made. These must be verified, after which they will be utilized for the purpose of correcting the original inventory by noting additions and deductions. To the corrected inventory must be applied prices representing the costs as of the date fixed for the corrected valuation, for the purpose of finding reproduction cost new. Depending upon the data you select for the purpose of correcting the valuation, the result makes an interesting study. Assuming the 1914 cost base to represent 100 per cent, approximately the following rates of increase would be added to get reproduction cost new:

For	1915																per	cent
	1916			0			9				9	9		٠		30	per	cent
	1917															81	per	cent
	1918														i	98	per	cent
	1919																	
	1920																	
	1921																	
	1922																	

These rates of increase would apply to all of the units, notwithstanding the fact that probably 70 per cent of the property was built at a cost not higher than the 1914 base. The next step will call for a proper force to determine the depreciated condition of all of the property. Just what weight is to be given these factors, when found, is an open question. "In like manner," requires their determination.

The above refers only to structures. It would still be necessary to solve the problem of finding the present value of the lands. Time forbids pointing out in detail the magnitude of the work involved, its cost and the time it would require to do it. Can the commission wait two years or longer for a valuation of all carrier property when it is needed?

What we should strive for is a plan which is both practical and fair. This requires that when a valuation is needed for a particular purpose it may be had without undue delay. Since the valuation work was started, the commission has had two comprehensive rate reviews when the valuation of all carrier property was urgently needed. There have also been rate investigations, confined to local territory. commission has called for average values for immediate use upon 136 properties for recapture purposes and this class of cases will increase in number and importance each year as time goes on. We now have requests for average values to December 31, 1922, for 26 railroad systems, comprising 177 properties with 50,000 miles of road. For these properties, the field work has not been completed. Many cases are handled by the commission relating to financing of car-These cases all call for valuation of the carriers' property. Again I inquire whether or not the commission and the interested carriers must wait until these values can be found "in like manner?"

In view of the fact that, as to all inter-state carrier properties, the commission now has complete jurisdiction over the licensing of new construction, abandonments and financing, it seems proper and safe to correct values by the cost basis. The plan proposed is to my mind eminently fair to the carriers and I believe it is only a matter of time when it will be accepted by them without protest. Once it is endorsed by the commission and acquiesced in by the carriers it is a fair presumption that the courts will sanction its adoption.

It is my opinion that the commission has no more difficult or important work than that of keeping valuations corrected down to date, and as soon as the bureau has completed the work of preparing tentative valuation reports, it should be reorganized to provide for handling all of the work covered by Order No. 3 and the work of correcting and revising valuations. The work is highly technical, calling for the employment of many experts, all of whom should have had years of experience in our valuation work, and the work

should be carried on as a separate branch of the commission's activities.

#### What Final Values Show

We are all anxious to know what the final figures will show. Any value figures here stated refer to the value as of date of valuation, not including cost of changes made subsequently. Rumors are in the air. These sometimes become current and when repeated often tend to influence public opinion. For example, a statement has been made by certain prominent public men and has been noted in the public press that, when the valuation is completed the aggregate value found by the commission will exceed the value of the property being used by the carriers by from ten billion to fifteen billion dollars, also that the value found for the common carrier lands will include five billion dollars, representing unearned increment in lands.

The tentative valuation reports on file up to November 1 show:

SHOW.			
For carrier property used	Tentative valuation reports served	Tentative valuat reports complete but not served	
Number of reports Number of properties Miles of road represented	54,974	191 262 31,818	
Final value of used property, including working capital		\$2,028,151,174	\$5,122,172,163
Present value carrier lands used, including rights Cost of reproduction less de- preciation of equipment	417,806,983	334,878,697	698,092,212
Percentage present value of lands used is of final	455,295,633	334,878,697	790,174,330
value	13.5	13.8	13.6
ciation of equipment used is of final value For carrier property owned:	13.8	15.3	14.4
Number of reports Number of properties	328 469	191 262	519 731
Miles of road represented  Investment in road and equipment as recorded by	54,938	31,217	86,155
Final value of owned prop-	\$3,565,088,581	\$2,226,832,668	\$5,791,921,249
erty, including working capital	3,079,636,849	1,990,854,624	5,070,491,473
lands owned, including rights	412,937,100	301,097,355	714,034,455
preciation of equipment	425,785,913	303,897,948	729,683,861
Percentage present value of lands owned is of final value	13.4	15.1	14.1
Percentage cost, less depre- ciation of equipm't owned			14.4
is of final value	13.8	15.3	14.4

I make no prediction as to what the final value figures will show. We can, however, give some indication of what the values will be based upon data set forth in the tentative reports now made up. These, of course, are all subject to change before the reports are made final. Analyzing the above figures we find that, based on the aggregate value as-

signed to the property used, the present value assigned to the lands is 13.6 of the total value, and for the property owned, the present value assigned to the lands is 14.1 per cent of the total value.

We find that the value reported for the property owned represents 87.5 per cent of the carriers' book investment in road and equipment. We find the investment for the 86,-155 miles of owned property shows an average of \$67,225 per mile (we cannot say that this will prove to be the average for all property). If the same figure is applied to the 250,000 miles we find an aggregate investment amounting to \$16,806,250,000. It must be remembered that the above figures reflect conditions as of the various dates of valuation and do not include the cost of changes made subsequent to the various dates of valuation. Apply 87.5 per cent to the \$16,806,250,000 and we get a value of \$14,700,000,000. In the light of the figures available, it appears safe to say that the present value of lands will be less than \$3,000,000,-000. It remains to be seen how the tentative reports will show \$5,000,000,000 representing unearned increment in lands or an excess of from \$10,000,000,000 to \$15,000,000,-000 in the total value.

In the reports served, covering 468 properties, the aggregate value found for the properties, in which protests have been filed, is \$2,214,387,962. In the same cases the carriers ask for an increase in the sum of \$1,346,042,936. The increase asked equals 60.7 per cent of the value reported. Other protests ask for increases but leave the amount blank.

Naturally the ever-present question is "When will the valuation work be finished?" The answer to this question depends much on contingencies such as:

 Failure to secure funds to pay the costs. Such a contingency will, of course, terminate the work.

The introduction of radical changes in methods may add greatly to the time required to complete the work.

Assuming that no material changes in methods are introduced, it is now hoped that practically all of the underlying reports will be completed and filed by July 1, 1924, and that the review of informal objections will be completed and revisions made by January 1, 1925. We have tentative valuation reports to prepare upon 1,207 properties, having 163,284 miles of road. Of these, reports covering 95,000 miles are well on towards completion. All of the reports should be completed and in the hands of the commission soon after the revisions of underlying reports are finished. When the hearings on formal protest will have been finished and the final reports written up, no wise man will hazard a guess. The work required to be done under Order No. 3, including the correcting and revising of valuations, is a continuous performance.



A Common Sight in Russia



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## Canada Is Now More Hopeful of the Future

Both Major Lines Improve Position in 1923—C. N. R. President Sees End of Deficit

By James G. Lyne

THE YEAR 1923 in Canada has been interesting from a railroad standpoint primarily because of improving conditions and for the grounds it gives for hoping that the government-owned lines may in a few years cease to be such a burden on the public treasury. These lines for the



Union Station, Winnipeg

first 11 months of 1923 had net earnings of \$16,602,603, as against \$5,772,116 in the same period of 1922. The earnings statement of the Canadian Pacific for the first 11 months of the year also showed an increase, the road having earned \$33,522,883 in 11 months of 1923 as compared with \$32,836,886 for the same period in 1922.

Speaking in Toronto on December 21, Sir Henry Thornton, president of the Canadian National, commented upon the great improvement in net earnings of this company during

the current year and predicted that, barring unforeseen conditions, the total for the year should reach \$18,000,000. On the basis of such an increase, he expressed the belief that net return in 1924 should reach \$30,000,000 and that in three years' time the lines would be earning enough to meet fixed charges and would cease to be a drain upon the public treasury.

The Canadian National, including lines in the United States, in 1922 had a deficit after fixed charges of more than \$60,000,000, which had to be met from taxation. The increase in net return in 1923 as compared with 1922 (\$10,-830,487 for the first 11 months) represents a direct saving of just that much to the taxpayers of Canada—except, of course, to the extent that fixed charges have been increased by additions and betterments. Naturally, therefore, railway developments during the year have interested the Canadian people.

There is a wide difference between economic conditions in Canada and the United States at the present time, which probably the American who does not read Canadian newspapers is not fully aware of. Primarily, the difference is one of prosperity. Business is not as active in Canada as it is in the United States. Consequently there is more dissatisfaction with things as they are. An analogy might perhaps be drawn between Canada and the agricultural areas of the United States, although, generally speaking, dissatisfaction is probably not so great throughout Canada as it is in the wheat-producing areas south of the international boundary.

## Pressure for Rate Reductions

When times are not prosperous and when at the same time living costs are high, the customary practice of the unthinking is to attack freight rates. Consequently there has been almost as much complaint about rates throughout the greater

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part of Canada as there has been in the grain-producing sections south of the border. This does not mean that criticism of the railways has been as venomous as in parts of the United States, but speaking generally, there is no question but that there is more general dissatisfaction with railway rates in Canada than in this country. The Maritime provinces want to be favored over ports in the state of Maine;



On Cape Breton Island

Ontario and Quebec want lower rates on coal from the Maritimes and Alberta.

Grain rates from the Prairie provinces eastward are regulated by the so-called "Crow's Nest Pass" agreement, which is a contract binding the Canadian Pacific to fix a certain low maximum rate on eastbound grain from the Prairie provinces.

traversed on the haul to the Pacific. Nevertheless, so great was the pressure brought to bear on the authorities that, in 1922, westward rates were reduced to bring their ratio to  $1\frac{1}{4}$  to 1. Still not satisfied, the Western politicians kept up the fight with the result that in 1923 the ratio was reduced to  $1\frac{1}{4}$  to 1.

## Rates Supposedly Based on Fair Return to C. P. R.

The Board of Railway Commissioners of Canada makes an effort, in so far as public sentiment will permit, to make rates high enough to allow the strategically located, financially sound Canadian Pacific to earn a fair return. How unsuccessful the board has been in this effort may be judged from the fact that this railway earned a net of over \$42,000,000 in the year ended June 30, 1914, as against \$38,000,000 in 1922—a reduction of \$4,000,000.

The effect of this rate policy on the less fortunately situated government lines is well known.

#### Canada's Fundamental Strength

Thus is Canada's railway problem inseparably bound up with her general industrial problem. There is, however, no need for any alarm about anything more than the immediate future. Congressman Sydney Anderson, who headed the Joint Congressional Committee of Agricultural Inquiry in the United States, and who doubtless knows what he is talking about when the subject is agriculture, recently in advocating an increase in the American wheat tariff made the statement that Canada could produce twice the average American yield of wheat per acre and of a better grade; moreover, that Canadian producers could do this on land which could be acquired at a fraction of the cost of wheat land in the United States. In spite of this handicap, American farmers continue to produce wheat for export markets and, generally, make money on it. Under such circumstances, with a return of Europe to conditions approaching normal, with populations financially able to purchase the wheat they



Amos, Quebec, on the National Transcontinental-Eight Years Ago a Wilderness

Naturally the Canadian National has to meet this rate. This agreement was suspended by the government due to conditions arising from the war, but was restored in 1922 as a result of popular agitation. This rate applied only to eastbound business, which situation naturally did not satisfy the farmers who wanted to ship their products via British Columbia and the Panama canal, nor did it suit the business interests in British Columbia which wanted to handle this grain. Westward rates had borne a relation to eastward on a ratio of  $1\frac{1}{2}$  to 1, justified by the mountainous country

would like to have, will mean undoubted prosperity to Canada.

The country now depends to a much larger degree than does the United States upon European markets. However, if these markets are once restored to normal, allowing real prosperity for a term of years to the agricultural population, the natural growth of this population, interrupted by the war and the effects of the war, will again be resumed, carrying with it industrial growth and a tendency to economic autonomy, such as has been attained in the United States where at

least a measure of prosperity can be enjoyed in spite of general depression in the rest of the world. There is no reason to fear for Canada or Canada's railways if only the test of the present and the next few years can be successfully met.

## Efficiency and Politicians

The Canadian Pacific does well even under adverse circumstances because it is soundly financed, strategically located and ably managed. The Canadian National, taken as a whole, is not strategically located because many of its lines run through sections which give it little tonnage. If these areas can be built up, its traffic will increase greatly. Moreover, with the management of all the lines consolidated in the able hands of the new president, who has just completed his first year of service in this capacity, these lines are securing and will doubtless continue to secure the advantages to be derived from efficient management.

The problem of securing the greatest efficiency has, however, been made more difficult by the politicians. In the Maritimes they are trying to force the Canadian National to divert traffic through their ports regardless of the advisability of such a step from an economic standpoint; in Parliament they try to make an issue out of every important administrative step taken by the management; other self-seeking interests are continually trying to secure unwarranted concessions by political pressure which can be exerted much more easily on the government-owned Canadian National than on the privately owned Canadian Pacific. The management fortunately has not wavered in resisting such pressure.

#### Ton-Mile Increase Not as Great as in the United States

Some measure of the relative slowness of revival in Canadian business as compared with that in the United States may be indicated by the fact that revenue ton-miles on all lines totaled almost 21 billion during the first nine months of 1923, or a little less than 15 per cent more than for the same period in 1922, whereas freight traffic in the United States measured in revenue ton-miles was more than 33 per

Pacific revenue ton-mile performance was 7,986,085,000—an increase of 10.3 per cent. Both roads enjoyed substantial increases in passenger business. The operating ratio of all Canadian roads for the first three quarters of 1923 was 90.85 as against 92.17 for the same period of the previous year. From reports made by individual companies for November and December it is evident that the full year 1923

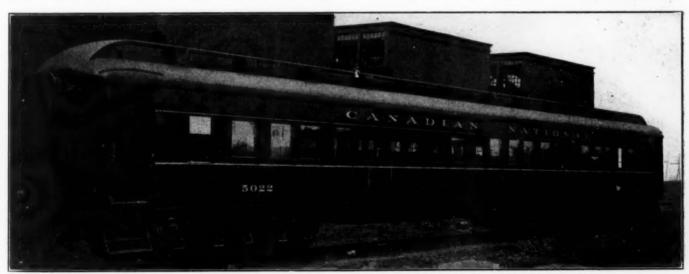


Halifax, Nova Scotia

will show a decrease in the operating ratio that will be much greater than that which is now indicated by the nine months' showing.

#### Great Increases in Net Earnings

Complete figures for all roads are not available for any months later than September, 1923. However, reports by the individual companies indicate a decided improvement since that date. The Canadian Pacific, for instance, earned a net of \$8,160,988 in October, an increase of \$3,663,017



Canadian National Standard Steel Coach

cent greater in the first eight months of 1923 than it was in the same period of the previous year. To be sure, the coal and shop strikes in 1922 had a greater effect on traffic in the United States than they did in Canada, but not enough to account for such a wide difference.

Revenue ton-miles carried by the Canadian National in the nine months, January to September, 1923, totaled 10,-463,116,000—an increase of 15.2 per cent over the same period of the previous year. For the same period Canadian over August; in November it earned \$6,110,470. Similarly the Canadian National earned a net of \$5,163,470 in October, an increase of \$3,295,693 over the previous month, in November it earned a net of \$4,581,318, as compared with \$1,949,000 last year. Freight traffic is concentrated into the last three months of the year as a regular thing, but in 1923 the sudden picking up in business and its continuance owing to mild weather in November and December was even more marked than usual.

#### **New Construction**

Not much new construction was undertaken or completed during the year. Probably the most important project from a traffic standpoint was the completion of the Canadian National's Long Lake cut-off, a short line connecting two trans-



C. N. R. Station, Vancouver, B. C.

continental lines formerly operated independently. This line, which will soon be open to traffic, will shorten the run of this company's trains between Winnipeg and the East by about 100 miles.

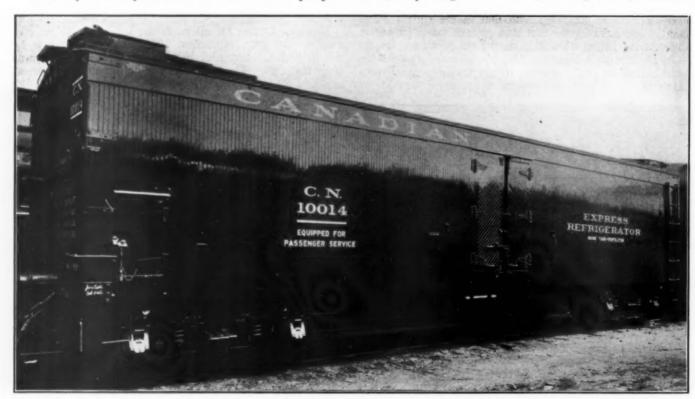
Some important improvements in Toronto are in prospect.

inate all grade crossings and bring the station into service, while saving about 30 per cent on the investment necessary under the all-viaduct plan. The decision of the municipal authorities at Toronto has not as yet been announced.

#### Branch Line Extension Program Delayed

At the 1923 session of Parliament the Canadian National experienced at the hands of the upper house a set-back in its program for extensive branch line construction. These plans were drawn up by officers of the railway and submitted by the Minister of Railways to Parliament. The House of Commons approved them and voted the necessary appropriation, but the Senate refused its assent, taking the position that large sums should not be spent for additions until the present investment in the railways became remunerative. Supporters of the construction program, however, point out that many of the lines provided for in the program are already partially built and that only small additional expenditures are necessary in order to make productive of revenue investments already made. They contend also that the lines proposed in the program would provide remunerative traffic and furthermore that settlers in territories served by them were promised these facilities when they entered upon the land. Not to carry out the program, therefore, its friends contend, would be a breach of faith on the part of the government. There is no doubt but that this plan will be presented again to Parliament in the session which begins in January.

The Canadian Pacific during 1923 put into operation about 180 miles of new branch lines. Both of the larger roads ordered considerable quantities of equipment during the year. These orders are as follows: Canadian Pacific, 36 locomotives, 64 passenger cars and 2,200 freight cars; Canadian

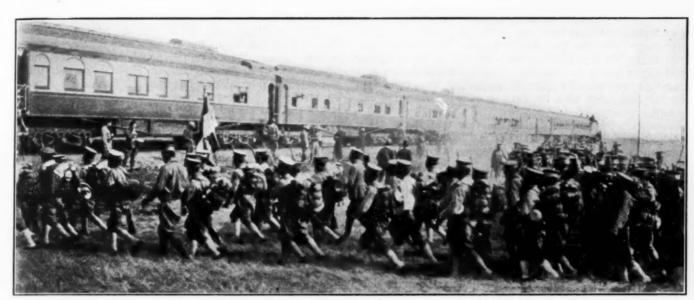


A Canadian National Express Refrigerator Car

The presidents of the C. P. R. and C. N. R. have signified to the city their willingness to abide by a contract entered into about 10 years ago to build a viaduct through the city and thus bring into use the union station, built in 1919 but not yet used by trains. This project will cost over \$30,000,000 and the railway presidents have offered as an alternative a plan for highway bridges and subways which will elim-

National, 25 locomotives, 167 passenger cars and 6,221 freight cars.

Canada's strength is not of the past, nor of the present, but of the future. With this year's improvement in the railway situation it becomes more clearly evident that the problems of today, which are serious enough, are not so difficult as to jeopardize her future.



Mexican Federal Troops Entraining Near Mexico City-Wide World Photo

# The Mexican Railways Continue to Improve

Heavy Rains Cause Considerable Damage and Political Conditions Complicate Matters

In GENERAL, railway conditions in Mexico during 1923 continued to improve. It is reported that the operating net of the National Railways was four and a half million pesos (about \$2,250,000) during the first six months of 1923. A small operating deficit was reported in September,

Wide World

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President Obregon (Right) on Rear of His Private Car at Scene of Hostilities

but it was expected that the movement of the large crops would enable the roads to make a better showing during the fall months. A statement, published in Mexico City in September, 1923, showed operating revenues (exploitation receipts) for the National Railways of Mexico and operated lines under government administration for the year 1922 to be 101,900,157 pesos, while the operating expenses (exploitation disbursements) were 97,864,853 pesos, leaving an operating net of 4,035,304 pesos. Operating revenues for 1921 were 112,408,076 pesos and operating expenses 110,-

096,612 pesos, leaving an operating net of 2,311,464 pesos. On this basis the returns for the first six months of 1923, as noted above, show a good gain for the first half of that year.

Two factors have operated to retard the steady advance which has been made in rehabilitating the railways. One of these was the heavy rains which caused damage to the extent of half a million pesos to the lines in the north. The other factor is the present political difficulties, the ultimate outcome of which it is impossible to forecast.

An official announcement on December 27 indicated that freight and passenger services are normal from all border crossings and also from the Port of Tampico. Ernesto Ocaranza Llano, director general, in this announcement, said: "We are ready to handle foreign freight through either Brownsville, Laredo, Eagle Pass or El Paso, Texas, and the Port of Tampico, for all stations on our system except those south of San Lorenzo and south of Cuautla (Puebla division) as well as stations on the Oaxaca division, south Trains are moving locally between San Geronimo and Suchiate (Pan-American division) as well as between Salina Cruz and Puerto Mexico (Tehuantepec division), but there is no through service between Mexico City and the above points on account of communication with Vera Cruz being interrupted. While all traffic has been restored on the Guadalajara division as far as Penjamo, service to Guadalajara proper is still interrupted, but I am expecting momentarily to be advised that conditions in this section have also been restored to normal."

Up to the time of the present difficulties it would appear that the passenger and freight services had been steadily improved and extended. After September 1 arrangements were made whereby through tickets were issued on a number of American railways. Through Pullman and express services to Chicago were also inaugurated over the Gulf Coast Lines, it being necessary only to move from one Pullman car into another at Brownsville, Tex.

The Mexican government, in order to foster and protect native industries, has levied high import duties and also grants preferential freight rates on many domestic products transported over the National Railways. The director general of the Mexican Railways was recently quoted as stating that 75 per cent of the products manufactured in Mexico were receiving rates over the National lines which were more than 50 per cent lower than the rates quoted on competing imported products.

Rumors were current during the year that there was a possibility of the railways being turned back by the government to the private owners, the government to retain a majority of the shares. The private owners are not naturally enthusiastic over such a development under these conditions. Those who are familiar with the situation do not believe that there is any possibility of an early return of the National Railways to their former owners.

## Southern Pacific Builds New Line

On March 5, 1923, work was started on the Southern Pacific Railroad of Mexico, on a line between La Quemada, Jalisco, and Tepic, Nayarit. This line is 103 miles long and it is estimated that it will cost \$12,000,000. It will fill a gap which will connect the United States and the Mexican Pacific coast with Mexico City, by way of the Southern Pacific and National lines. The importance of this project was indicated by the fact that President Obregon, several members of his cabinet and other prominent officials were present at the official opening of the work. The construction of the road will involve difficult engineering projects, since it will be necessary to bore many tunnels and build a large number of bridges. The new line is through virgin territory known to contain rich mineral deposits. The west coast of Mexico at present is quite isolated from the other parts of the republic, because of the slow and circuitous communication. The completion of the new line is expected to encourage tourists to visit western Mexico and will open up the rich natural resources of this territory. Not the least of the advantages of this new project is the moral effect, in that it is a demonstration of the confidence of American capitalists in the future of Mexico.

### A Big Electrification Project

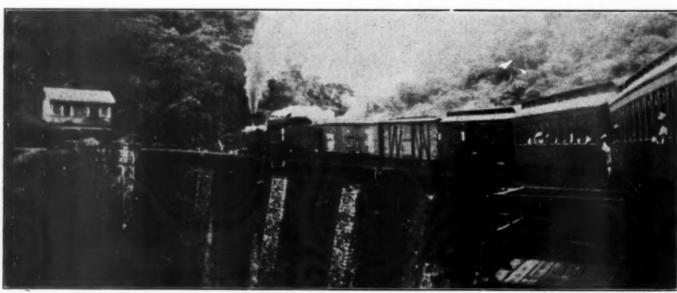
In November, 1922, the Mexican Railway Company made a contract with the International General Electric Company for the electrification of 30 miles of single track between

Orizaba and Esperanza. This is on the main line between Mexico City and Vera Cruz. This step was made necessary in order to postpone indefinitely double tracking this section. The grades are heavy-4,000 ft. in elevation on the 30-mile section—and the traffic is fast growing beyond the capacity of a single track line with steam operation. Incidentally, this is the first main line section to be electrified on a steam railroad in Mexico. The work on this project went on steadily during 1923 and it is expected that the electrified section will be ready to operate next March. Ten 150-ton, 3,000-volt direct-current electric locomotives have been built by the General Electric Company and the American Locomotive Company for this installation. A description of these locomotives was published in the Railway Age of December 1, 1923, page 1021; they are interchangeable for freight and passenger service. Power will be furnished by the Pueblo Tramway, Light & Power Company, which has a hydroelectric plant five miles from Orizaba.

## Tehuantepec National in Bad Shape

Just as some railways in the United States have suffered severely, or even had to be abandoned because of changes in traffic conditions, so at least one railroad in Mexico is encountering similar difficulties—the Tehuantepec National Railroad. Its purpose was to unite both the oceans by crossing the isthmus of Tehuantepec, and thus allow rapid means of communication over the land and shorten the long voyage of the ocean steamships around Cape Horn. It proved to be a great success, but the completion of the Panama Canal diverted international traffic from the railroad. It now has very little if any international traffic and there is not sufficient local business to keep it on a paying basis. The line is losing large amounts yearly and the roadbed and equipment have greatly deteriorated. Unless the government can adopt measures for its economic support it would seem as if the line would have to be abandoned.

Early in the year the Secretary of Industry, Commerce and Labor, representing the government of Mexico, signed a contract with the National Railways of Mexico, which permitted the railways to explore and bore for oil in certain federal lands designated by the government. The purpose was to permit the National Railways to secure such oil as was necessary for their operation at a lower price than could be had by buying from the petroleum companies.



P. & A. Photo.

Railroading in Mexico

## Statistical Section

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s it Railway Statistics for the Year 1923, by Julius H. Parmelee

Railway Construction Resumed on Large Scale
Signal Construction Shows Marked Increase
Receiverships and Foreclosure Sales During 1923
Dividend Changes on Railway Stocks in 1923
Telegraph and Telephone Construction
Status of Accounts with the Government
Record-Breaking Increase in Motive Power
Large Progress in Passenger Car Acquisitions
Freight Car Increase Breaks All Records
Chronological Review of Major Events in 1923

## Railway Statistics for Nineteen Twenty-three

## The Railroads Handled a Big Task and Handled It Well— Eleven Records Were Broken

By Julius H. Parmelee

Director of the Bureau of Railway Economics

FOR THE FIRST TIME in at least seven years, the railways of the United States have experienced a reasonably normal 12 months of operation. During the year 1923 they set for themselves an ambitious goal of operating efficiency, and in most respects surpassed their goal. They handled a record-breaking freight traffic without confusion or serious complaint. They received whole-hearted co-operation from the shippers. To a large degree, the railways were able to operate their lines without undue interference.

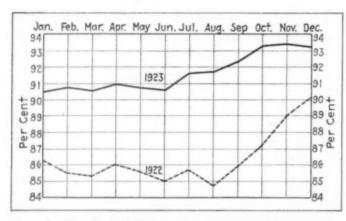


Chart A-Per Cent of Freight Cars in Serviceable Condition

In other words, as one observer outside the railway industry has aptly put it, the railroads in 1923 went back to railroading. Not that they did not want to go back before, but that conditions did not permit them to.

## A Summary of Achievement

A statement issued by the American Railway Association in November asserted that the railways of the United States had broken eight records in the year 1923. Now that the year has closed, it is possible to add three more to the list. The 11 records were as follows:

(1) The greatest number of installations of new equipment, both locomotives and freight cars, in more than 10 years.

(2) The lowest percentage of unserviceable locomotives ever recorded, and a lower percentage of unserviceable freight cars than since 1917.

(3) The greatest number of locomotives and freight cars put through the repair shops than in any year in railway history.

(4) The largest freight traffic in American railway history. This is true whether the traffic be measured in ton-miles or in number of cars loaded.

(5) A record-breaking traffic handled virtually without congestion, car shortage, or embargoes.

(6) The greatest daily movement per freight car ever, recorded.

(7) A heavier than normal loading per freight car.(8) The greatest number of ton-miles per car per day.

(9) The heaviest movement of coal to the lakes, for transportation to the Northwest.

(10) The greatest amount of coal storage in stock piles ever reported by the railways themselves.

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(11) Larger total revenues than in 1921 and 1922, although on a lower basis of freight and passenger rates than was in effect in those years.

This list should by all rules of logic continue to the point where it could be stated that the railways also earned the largest net income in their history. Unfortunately, the chain of superlatives breaks at this point, as will be shown in a later paragraph.

## New Equipment

During the year 1923 the railways of Class I, according to reports made to the Car Service Division of the American Railway Association, installed approximately 3,750 new locomotives, 200,000 new freight-train cars, and 2,300 new passenger-train cars. As to freight cars, this was the largest number installed in more than 16 years; as to locomotives, the largest number in 10 years; as to passenger cars, the largest number in six years. On January 1 of this year, the railways had on order approximately 500 locomotives and 20,000 freight cars, indicating that they will install a reasonably large number of new equipment units in 1924 as well.

Along with this encouraging increase in new equipment, there went a striking improvement in the physical condition of equipment already in service. The number of locomotives in good repair and serviceable condition was greater by 7,100 at the end of 1923 than at the beginning, while the corres-

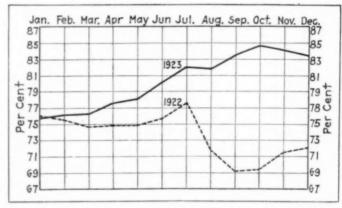


Chart B-Per Cent of Locomotives in Serviceable Condition

ponding increase in the number of freight cars in good repair during the year was 63,000 cars. This is a striking tribute to the importance of the maintenance of equipment department in keeping the railways fit to move trains of loaded freight cars.

In the accomplishment of this feat, the railways put more locomotives and more freight cars through their repair shops during 1923 than in any previous year in their history. Not only did they catch up on the arrears of units of equipment awaiting repair, but they kept even with the current wear and tear, which was unusually heavy because of unprecedented traffic

Charts A and B show the percentage of freight cars and

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locomotives, respectively, in serviceable condition on the first of each month in 1922 and 1923. Not only did the situation improve during the year 1923, but was at almost every point better, and at times much better, than on the corresponding dates in 1922.

## A Record Freight Traffic

Whether measured in ton-miles or in carloadings, the amount of freight transported by the railways in the year 1923 was the greatest ever recorded. The previous peak occurred in the year 1920. In 1923 the net ton-miles were some two per cent greater than in 1920, and the revenue carloadings 11 per cent greater. In 1920 the total net ton-miles of railways of Class I aggregated 447 billion; in 1923, the corresponding aggregate was approximately 457 billion. The total carloadings in 1920 were 45 million; in 1923 they amounted to nearly 50 million. With the last two weeks of the year estimated, it appears likely that the total was within 100,000 cars of that very respectable total.

Chart C shows in graphic form the weekly carloadings for each month of 1923, compared with 1922. The line for 1923 at all points runs well above that for 1922.

A striking feature of this record movement was the almost complete absence of complaints from shippers, of car congestion, or of any appreciable amount of car shortage after the first three months of the year. In fact, a considerable car surplus existed even during the weeks of heaviest traffic, an almost unprecedented occurrence in railway annals. This surplus ran from 59,000 cars during September to 216,936 cars in the second quarter of December.

The achievement of the railways in respect to freight transportation failed of realization in respect to the passenger traffic. The passenger business of the railways has suffered severely during the past three years, partly because of depressed business conditions, and partly because of the very real competition of the motor car. In 1916 the passenger business of the railways broke all previous records. That record was broken successively each year from 1917 to 1920. In 1921 the passenger traffic suffered the greatest reduction, both absolutely and relatively, ever experienced in a single year. The passenger-miles fell off more than 20 per cent in 1921 as compared with 1920, and followed in 1922 by a still further decline of 5 per cent. In 1923 there was a partial comeback, the business being some 7 per cent greater than in 1922, although still much below the high level attained in 1920. In fact, passenger-miles in 1923 ran about 19 per cent below those of 1920.

## Operating Efficiency

Of the many factors that go to make up railway operating efficiency, the average daily movement per freight car and the average load per loaded car are among the most important. In both these respects the railways made progress in 1923.

The average daily movement per freight car during the first 10 months of the year was 27.9 miles, compared with 23.5 miles in the year 1922 and 22.4 miles in 1921. The goal set by the railways for themselves in this respect was to achieve, for at least a single month, an average of 30 miles per day. Prior to 1923, such an average had never been attained, but was reached in October of the year just closed, when the average was 30.7 miles.

Although a corresponding increase in average load per car was not attained, there was sufficient improvement to warrant satisfaction. In the matter of the average load, much depends on the co-operation of the shipper, and a good deal also on the character of the commodity carried. Many high grade articles, such for example as automobiles, are so bulky with respect to their weight that they cannot possibly be loaded to the full tonnage capacity of the car. It follows that where the proportion of high grade traffic is large, the average load per freight car cannot be so high as when there

is a greater proportion of low grade and heavy loading commodities, such as coal, ore, road building materials, and the like. One of the striking features of the freight traffic of 1923 was the heavy movement of manufactured articles, compared with the movement of lower-grade materials. This undoubtedly accounted in part for the lesser increase in the average load per car than was recorded in average daily movement.

During the first 10 months of 1923 the average load per car was 28.0 tons, compared with 26.9 tons in the year 1922, and 27.6 tons in 1921. The average for 1923 has been surpassed in only two years of which there is record.

The two factors of miles per car per day and average load per car, when combined into a single coefficient, produce the factor of total ton-miles per car per day. This factor reached a record level in 1923. The average for the first 10 months of the year was 517 ton-miles, compared with 424 ton-miles in the year 1922, and 389 ton-miles in 1921.

There were additional indications of railway efficiency in 1923. Not only was the movement of coal to Lake Erie ports for transportation by water to the northwest the heaviest on record, but it was virtually completed at an earlier date

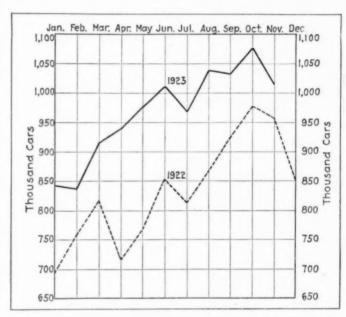


Chart C-Average Weekly Car Loadings-All Commodities

than usual. More than 31½ million tons had been moved up to December 31, compared with 19 million tons in 1922 (which was low on account of the coal strike), and 23 million tons in 1921. Another indication was the large amount of coal stored by the railways themselves for their own use, in order to get their own movement out of the way of the general commercial movement of coal and other commodities during the fall months. On December 1, for example, the railways had in stock piles a total of 17 million tons of railway coal, compared with 13 million tons on April 1, 1922, which was the previous high water mark, and was due to the expected advent of the coal strike of that year.

#### Financial Results

The total operating revenues of the railways of Class I in 1923 approximated \$6,400,000,000, compared with \$5,617,000,000 in 1922, and \$5,573,000,000 in 1921. As will be pointed out later, a considerable portion of the increase in revenues was absorbed by the necessarily larger operating expenses of the year, so that the railways did not fully secure the benefit in the shape of net income.

The operating expenses of the year 1923 amounted to approximately \$4,990,000,000, compared with \$4,456,000,000

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in 1922, and \$4,604,000,000 in 1921. Although the expenses were greater than in either of the two previous years, they were \$840,000,000 less than in 1920. This reduction between 1920 and 1923 is a fair measure of the increase in railway operating efficiency during that period, which was brought about in part by a reduction of forces, and in part by a reduction in wage rates and material prices. The resultant of these several factors, combined with intelligent and devoted management, made possible a large reduction in expenses under those of 1920, in the face of a considerable increase in the amount of freight traffic handled.

Taxes during 1923 showed no disposition to cease their long upward climb. Having crossed the 300-million dollar line in 1922, they went up to \$334,000,000 in 1923, an increase of 10 per cent. Railway taxes have doubled since 1916, a period of seven years, and are now higher than ever

The net operating income in 1923 approximated \$975,-300,000. This compares with \$777,000,000 in 1922, and \$616,000,000 in 1921. The rate earned on the tentative valuation fixed by the Interstate Commerce Commission, plus additions and betterments to date, was 5.08 per cent in 1923, 4.14 per cent in 1922, and 3.33 per cent in 1921. It will be recalled that the goal toward which the net income was directed in those years was 6 per cent in 1921 and 534 per cent in 1922 and 1923, the "fair return" having been reduced by the commission from 6 to 534 per cent on March 1, 1922. This reduction in the legal rate was only a change on paper, for the railways did not in any of the three years attain even the lower of the two rates.

Table I presents these financial statistics in a condensed way. This table, and the others that follow, apply to railways of Class I. In all of them, the totals for 1923 are partially estimated, and are subject to revision when the final returns for the year have become available.

			TABLE I		
				1923	1922
Total Taxes	operating	expenses		4,990,000,000	\$5,677,000,000 4,4% 000,000 305.629,000 777,000,000

## Operating Revenues

Railway operating revenues in 1923 were greater by \$783,-000,000 than in 1922, and by \$175,000,000 than in 1920, the previous record year. Since the rate increase of 1920, considerable reductions in freight rates have been effected, some of which applied to the whole year 1922, some only to part of that year, while all of them were fully effective during the year 1923. In other words, the increase in revenues in 1923, compared particularly with 1922 and 1921, was due to no increase in rates, because the rates were actually lower, but was due entirely to the increased freight and passenger traffic.

The freight revenue amounted to \$4,666,000,000, compared with \$4,007,000,000 in 1922, and \$3,928,000,000 in 1921. This was an increase of 16.4 per cent over 1922 and 18.8 per cent over 1921. The passenger revenue aggregated \$1,-151,000,000, compared with \$1,076,000,000 in 1922, and \$1,-154,000,000 in 1921. This was an increase of 7.0 per cent over 1922 and a decrease of a fraction of 1 per cent under 1921.

Table II compares the revenues for 1923 with those for 1922, showing the principal sources of revenue separately.

TABLE II	1923 (millions)	1922 (millions)
Freight revenue	\$4,666	\$4,007
Passenger revenue	1,151	1,076
Mail revenue		91
Express revenue	157	143
All other revenue	334	300
Total	. \$6,400	\$5.617

### Operating Expenses

The operating expenses for 1923 were \$4,990,000,000. This was an increase of \$534,000,000 over 1922, or 12 per cent, and was \$386,000,000, or 8.4 per cent, greater than in 1921. The increase was due partly to a much larger traffic, and partly to the effort of the railways, already described, to place their equipment in proper condition for the heavy demands of traffic. Total compensation to labor was greater than in 1922, the number of employees being greater, while there was a tendency throughout the latter part of the year for the wages of certain large classes to increase. The full effect of these increases will not be felt until 1924, because none of them were in force during the whole of the year 1923.

The same was true of prices, which showed a tendency to stiffen as the year drew to a close.

Table III gives the several items of operating expense in 1923, compared with 1922. Every account showed an increase. As against an increase in total operating expenses of 12 per cent, maintenance of way increased 11.3 per cent, maintenance of equipment 18.3 per cent, and transportation expenses 9.9 per cent. The increase in maintenance of equipment represented, of course, the necessary cost of putting the equipment in good physical condition.

TABLE III		
	1923 (millions)	(millions)
Maintenance of way and structure	\$819	\$736
Maintenance of equipment	1,490	1,260
Traffic	90	87
Transportation		2,175
General and other	200	198
Total	\$4,990	\$4,456

## Net Operating Income

The net operating income was in some ways the disappointing feature of the year 1923. This remark is made with full recognition of the fact that the net income was larger than in any year since 1917, and that the rate of return on valuation showed an increase over any of the years since the Transportation Act went into effect. But railway investment and value was also greater than ever before, and called for a greater net income to carry it. It is generally agreed that 534 per cent is not an excessive rate of return, year in and year out, for the railways to earn on their valuation, for the valuation itself is fixed under government auspices, and

TABLE IV	Rate of return per cent (Annual basis)
One month	5.56
And the second of the second o	
Two months	
Three months	. 5.13
Four months	. 5.49
Five months	. 5.69
Six months	. 5.64
Seven months	. 5.51
Eight months	. 5.41
Nine menths	
Ten months	
Eleven months	
Twelve months—the year	. 5.08

can be regarded as a conservative aggregate. This being so, it follows that in a good traffic year the railways should reasonably expect to earn more than a fair return, so as to balance the lower-than-average returns of years of lesser

Railway net operating income in 1923 amounted to \$975,-000,000, which was equivalent to 5.08 per cent on the tentative valuation of their properties. This amount was \$127,-000,000 short of the total amount which would have represented the fair return of 534 per cent. When the railways in the year of heaviest freight traffic ever known earn only

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cent, the situation gives cause for careful consideration.

The rate of return by months, cumulated through the year, is shown in Table IV.

## Railway Traffic in 1923

Revenue car loadings in 1923 increased over 1922 about 16 per cent, whereas the net ton-miles increased about 23 per The increase in passenger miles was 7 per cent.

The aggregates of these three traffic factors, for the years 1921, 1922, and 1923, appear in Table V below.

	TABLE V	
	CAR LOADINGS	
1923 1922		49,900,000 43,207,000
1921	••••	39,323,000
	NET TON-MILES	
1923	***************************************	457,000,000,000
1922		371,946,000,000
1921		340,862,000,000
	Passenger-Miles	
1923	*************************	38,000,000,000
1922		35,470,000,000
1921		37,313,000,000

As is usually the case, the freight traffic as a whole showed one rate of increase, while the several commodities entering into that traffic showed widely varying rates of increase. These variations may be studied in terms of the carloadings

of the several principal groups of commodities.

All the groups except grain increased over 1922. Grain loadings fell 6 per cent, but were greater than in any previous year except 1922. It will be recalled that the grain movement of 1922 broke all records. One of the striking features of the grain movement in 1923 was the almost complete absence of car shortage, and there was little complaint from the agricultural regions as to the method and result of car distribution during the crop season. In fact, 50,000 box cars were placed at strategic points throughout the principal crop areas several weeks in advance of the harvest season, and were there held in storage, awaiting the grain traffic movement. Such a situation is almost unprecedented in railway annals.

Livestock movements broke all records, the total carloadings for the year being about 11 per cent greater than in 1922.

The coal and coke traffic increased 32 per cent over 1922, but 1922 was a poor coal year because of the coal strikes. The coal movement in 1923 was 5 per cent less than in 1920. There was no coal shortage at any time during 1923, and even the abortive coal strike of September caused hardly a flurry in the fuel market. Partly because the general public laid in their supplies earlier than usual, and partly because of the mild weather that prevailed during November and December, the demand for coal in those months fell off, and the movement by rail was correspondingly reduced.

The one big feature of the carloadings of 1923 was the great increase in the movement of merchandise and manufactured products. The carloadings of these products were greater than ever before, and ran 2,500,000 cars, or 10 per cent, ahead of the corresponding figure for 1922. In fact, there was more than one week during the year when the movement of this class of products alone was greater than the total movement of all products in certain weeks of 1921.

All the other products showed heavy increases, especially ore, which increased 49 per cent, and forest products, which

increased 30 per cent.

The partial come-back of the passenger traffic in 1923 was experienced in the face of an even greater output of new motor cars than in 1922. There is no reason to expect any lessening of competition from the automobile industry in that

5.08 per cent, compared with the "fair return" of 5.75 per respect. If anything, the competition seems likely to increase, both intensively and extensively.

### Receipts Per Traffic Unit

The average receipts per ton-mile were approximately 1.11 cents in 1923, which was 5.7 per cent lower than in 1922, and 12.9 per cent lower than in 1921. These percentages portray, with a fair degree of accuracy, the extent to which railway freight rates were reduced during 1922 and 1923. The percentages are large enough, when applied to the tre-mendous volume of freight traffic handled on the railways as a whole, to represent a real and very substantial saving to the shippers of the country. For example, the reduction in freight rates between 1921 and 1923, when applied to the traffic of 1923, means a saving in the latter year of \$700,-000,000. That is, if the rates in 1923 had been at the same level as in 1921, the total freight revenue would have been greater than it was by that amount.

Average receipts per passenger-mile in 1923 were approximately 2.99 cents. This was about 1 per cent lower than in

1922, and 3 per cent lower than in 1921.

## Employees and Their Wages

The total number of railway employees in 1923 was close to 1,880,000, which was greater by 235,000, on the average, It was, however, less by 174,000 than in 1920, in spite of the fact that the freight traffic handled in 1923 was greater than in 1920, and that the physical amount of maintenance put into equipment, and probably also into roadway, was greater than in the earlier year. This is one measure, although not the only one, of the increase in railway operating efficiency between the two years.

The railways paid their employees a greater annual compensation in 1923 than in 1922 by about 1.4 per cent. average was \$1,622 for 1922, and is estimated at \$1,645 for 1923. Many of the classes received wage increases during the year. It seems likely that both the wage rates and the average annual compensation per employee will be higher in 1924 than in 1923, because many of the wage adjustments made in 1923 will have their full effect during the coming

The total payroll of Class I railways was \$3,100,000,000 in 1923, compared with \$2,669,000,000 in 1922. This was an increase of \$431,000,000, or 16.1 per cent.

Table VI gives the number of employees in each month of 1922 and 1923, so far as the figures are available. The October total for 1923 is partially estimated.

#### TABLE VI NUMBER OF EMPLOYEES

	1923	1922
January	. 1,779,516	1,552,014
February	. 1,783,555	1,545,040
March	. 1,816,479	1,570,158
April	. 1,843,652	1,578,133
May	. 1,896,219	1,628,228
June	. 1,933,929	1,685,414
July	. 1,954,687	1,467,824
August	. 1,973,505	1,594,074
September	. 1,945,917	1,708,591
October	. 1,936,500	1,804,315
November		1,820,463
December		1,788,590

In conclusion, the railways can and will look back upon the year just closed as a remarkable one in many ways. They handled a big task and handled it well. The managements and personnel merit high praise for the devotion with which they set themselves a definite program and then met the program. The public did its share, and a big share it was. On the threshold of a new year, the railways can therefore look back upon one more step away from the almost complete demoralization resulting from the war and its attendant evils. Is it too much to hope that the year 1924 will record still another step in the right direction?



Placing the Concrete Deck on the Central's Castleton Bridge

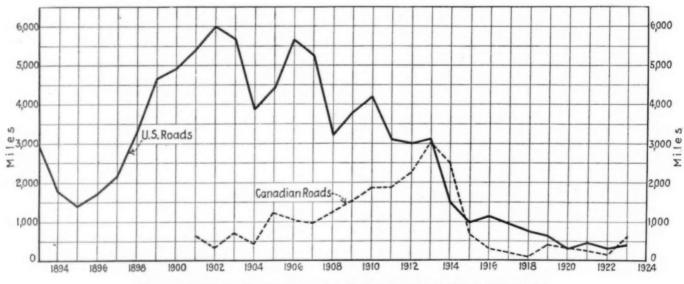
## Railway Construction Resumed on Large Scale

## Improvements During 1923 Involved Chiefly Terminal, Second Track and Other Operating Necessities

THE AMOUNT of first track which was completed during 1923 continued to remain at the comparative low level of the last three or four years and much below the mileages previous to 1914. It was only 427.27 miles. The total miles of abandoned lines, however, declined considerably from that of previous years, the exact figures being 128.82 for track abandoned and taken up and 384.13 for

ing generally, the construction and mileage statistics indicate a much more stable condition of the country's mileage, and the inauguration of an era in railway construction wherein expenditures will be utilized to secure an intensive development of the existing plant in order to provide for increased traffic density and greater operating efficiency.

The total mileage (first, second, third and other main



Curves of Mileage Constructed in the United States and Canada Since 1893

track abandoned and not taken up, or a total of 512.95 miles. Second track, on the other hand, increased considerably over the previous year's levels, there having been 683.99 miles completed during the year, with a large amount under construction, or contemplated for early prosecution. General construction increased greatly, the statistics evidencing the inauguration of many new projects and the completion or near-completion of many others of importance. Speak-

track) was practically double that of the totals for each of the preceding three years, reaching 1,176.07 miles; of this 683.99 miles, 41.73 miles and 23.08 miles represented second, third and other multiple main track, respectively. The figures for second track for 1922, 1921 and 1920 are respectively 195.97, 143.07 and 90.87. Second track thus shows a healthy increase, the amount exceeding that of all previous years back as far as 1913, when approximately

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NEW TRACK BUILT IN 1923

New '	TRACE	Director	9.32	1022

			1	Miles						3	files		
United States	Number companies building	First track	Second track	Third track	Fourth or more track	Total	United States	Number companies building	First track	Second track	Third track	Fourth or more track	Tot
Alaska	. 1	64.00				64.00	Alaska	1	8.12			****	8.
Arizona	. 1		89.49			89.49	Alabama	1	7.30				7.3
California	. 4	84.22	111.83			196.05	Arizona	1		25.68	****		25.6
Florida	. 2	10.00	4.00	****		14.00	California		36.85	21.28			58.1
Georgia	. 1		23,00			23.00	Idaho	1	7.46	17.67			25.1
Idaho		15.29	9.70			24.99	Illinois	4	15.00	21.27	14.60	4.83	55.7
Illinois		5.82	60.97	11.92	5.19	83.90	Indiana	2		6.22	0.20		
Indiana			21.89	0.24	0.06	22.19	Kansas	2	70.74	12.80		0.17	6.5
Kansas		12.39	47.38	5.98		65.75		4	2.58				83.5
Kentucky		2.50	33.08	2.39		37.97		9		16.23			18.8
Louisiana		13,24	11.62			24.86	Louisiana	3	20.25	2000			20.2
Maine		0.40					Michigan	3	3.27	2.51			5.7
			1 41			0.40	Mississippi	1	9.50				9.5
Maryland	~	1.41	1.41			2.82	Missouri	1		8.32			8.3
Michigan		37.15	33.72			70.87	New Jersey	2	1.66		2.68		4.3
Minnesota		32.40	7.41			39.81	New York	1	2.00				2.0
Mississippi		9.00				9.00	North Carolina	2	12.00	3.02			15.0
Montana	. 1		18.98			18.98	North Dakota	1		11.55			11.5
Nevada	. 1		29.14			29.14	Ohio	4		15.58			15.5
New Jersey	. 2	0.87	1.03	1.61		3.51	Oklahoma	3	39.68	****			39.6
New Mexico			31.23			31.23	Oregon	1	2.00				2.0
New York	. 3	2.53	0.43		10.46	13.42	Pennsylvania	4	6.52	0.23		* * * *	
North Dakota	. 1		10.98			10.98	Rhode Island	1		0.23			6.7
Ohio	-	5.08	23.09	13.37	1.15	42.69	Tande Island		0.50				0.2
Oklahoma		16.64				16.64	Tennessee		10.50	1.01		* * * *	11.5
Oregon		19.00	****		****	19.00	Texas		13.00				13.0
		8.43	15.06	6 22	6.22		Utah	1 4	32.00	****			32.0
Pennsylvania			39.00	6.22	6.22	35.93	Washington			30.95			30.9
South Carolina		1.00	4.000			39.00	West Virginia	3 2	23.66	1.42			25.0
Tennessee		1.60	0.00			1.60							-
Texas	. 3	7.34	0.33			7.67	Total	57 32	24.09	195.97	17.57	5.00	542.6
Jtah		43.23	11.41			54.64	Canada	- 5 14	4.50				144.5
Virginia	. 2	21.33				21.33							- 1110
Washington	. 1	3.00				3.00							
West Virginia		10.40	4.80			15.20							
Wyoming			43.01			43.01							
Total		27.27	683.99	41.73		1,176.07							
Canada	2 6	54.59	16.09	3.74		674.42							

1,263 miles were completed. The nearest approach to the 1923 figure in recent years was that for 1918, when 681 miles were built.

Except for the Alaska Railroad, the mileage of first track which was constructed during the year consisted chiefly

of small units varying from a fraction of a mile up to a few isolated maximums of about 30 to 35 miles, representing generally short extensions of a minor nature rather than any tapping or opening up of new territory. The greatest amount of first track by states was 84.22 miles for California, with

Li	nes	Abandoned	in	the	United	States	and	Canada	During	1923

	Lines abandoned ad taken up	Lines aban- doned and not taken up		Lines abandoned	Lines aban- doned and
United States	Miles	Miles	United States	and taken up Miles	not taken up Miles
Baltimore & Ohio-			Oregon Trunk-		
Magnolia, Ohio, to Wilcock's mine	2.78	* * * * *	Metalius, Ore., to South Jct	** ****	29.4
Pigeon Run Jct., Ohio, to Woodland mine	5.63		Pacific Electric—		
In vicinity of Sandville, Ohio	1.46	* * * * *	Near Redlands, Cal		* * * * *
Blytheville, Burdette & Mississippi River-		0.0	Near Beverly Hills, Cal		* * * * *
Burdette, Ark., to Burdette Jct		2.0	Near Brush Canon, Cal	1.56	*****
Caddo Choctaw—	10 85		Pennsylvania System—	4.62	
In Pike county, Ark	12.75		Near Fairbrook, Pa	4.63	*****
Central Wisconsin—			Barnegat City, N. J., to Barnegat City Jct		8.12
Owen, Wis., to Cleghorn		65.0	In Pennsylvania		4.81
Colfax Northern-		1.04	In Maryland		1.23
In Iowa		1.04	In Ohio	1.17	
Chicago, Milwaukee & St. Paul-	F 4		Philadelphia & Reading—	0.0	
Cogswell, N. D., to Harlem	5.1		On Cambridge Colly branch, Pa		
Warren, Ill., to state line	0.4	****	On Delaware River branch, Pa	0.78	
Lynn, Wis., to Romadka	5.2	*****	Rutland—	174	0.00
Gratiot, Wis., to state line	5.2		Ft. Ticonderoga, N. Y., to Larrabees Point,	Vt	0.82
Colerado & Southern-	10.11		Seaboard Air-Line		1.01
Hancock, Colo., to Quartz	12.44	* * * * *	Thames, Ga., to Thames Jct		1.91
Parlins, Cele., to Gunnison	11.42	00.10	Williams, Ga., to Williams Jet		0.53
Buena Vista, Colo., to Hancock		29.19	Tampa Northern-		
Dallas, Cleburne & Southwestern-		0.00	Near Tooke Lake, Fla	2.58	*****
In Texas		9.82	Tennessee, Alabama & Georgia-		
Empire & Scuthwestern-	11 25		Owl Hollow, Ga., to main line		1.32
Empire, Mich., to Empire Jct	11.35				2100
Fourche River Valley & Indian Territory-		20.0	Tionesta Valley—		6.25
Bigelow, Ark., to Thorneburg		, 20.0	Nausen, Pa., to Crane Run		0.43
Helena, Parkin & Northern-		15.5	Woodward Iron Company—		
Parkin, Ark., to Prather		15.5	Near Hillcrest, Ala	0.6	
McKeesport Terminal-		2.0		400.00	
At McKeesport, Pa		2.0	Total	128.82	384.13
Macon & Birmingham—		96.7			
Sofkee, Ga., to La Grange	* * * * *	90.7	Canada		
Marietta & Vincent-	* * **		Canadian National—		
Vincent, Ohio, to Moore's Jct	11./	* * * * *	Riviere Quelle, Que., to Riviere Quelle Jct	. 6.48	
Missouri Pacific—	0.14		At Napanee, Ont		
Near Grand Falls, Mo	0.14		Udney, Ont., to near Orillia		
Near Warrensburg, Mo	2.65		At Nipi sing Jet., Ont	1.04	****
Mississippi Southern-	7.0		Brighton, Ont., to Cobourg		
Near Wiehe, Miss	7.0		Pecahontas, Alta., to Snaring Jet		****
Nevada, California & Oregon-	12.0	4.0	Stony Plains, Alta., to Edmonton		****
Wendell, Cal., to Hackstaff	12.0	4.0	Bickerdike, Alta., to Ansell		****
Norfolk & Western-	0.60		Duhamel, Alta., to Dinant	10.25	
On Allison branch, Va	0.73	****	At Point Tupper, N. S		
On Pe'ters branch, Va	0.73		At Conmee, Ont		2.98
Oakdale & Gulf-	5.13		North Lake, Ont., to Mackies		23.26
Caney, La., to Wardo	3.13		Ardmore, Sask., to Regina Tower		4.13
Ocklawaha Valley—		54.0	Entwhistle, Alta., to Evansburg		5.54
Palatka, Fla., to Ocala		34.0	Entwinsile, Alta., to Evansout 8		
Ocilla Southern-		30.49	Total	92.22	35.91
Fitzgerald, Ga., to Pope City		30.47	Addi		

Utah second with 43.23 miles, the mileage of the former being almost entirely that of the Southern Pacific and the Minarets & Western.

In Canada, however, the amount of new first track increased greatly over 1922 or 1921, reaching a figure of 654.59 miles, of which all but 88.29 miles (the work of the Canadian National) was constructed by the Canadian Pacific, which thus constructed or put into operation a total of 566.3 miles. This represented chiefly the completion of a number of branch lines which this road has had under way for a number of years for the opening up and developing

	MILES	OF	New	LINE	Сомв	LETED IN	THE	UNITED	STATES	SINCE	1893
1894	4					1,760	1909				3,74
	5					1,420	1910				. 4,12
1896	5				0000	1,692	1911				. 3,06
	7					2,109					
1898	3					3,265	1913				
1899						4,569	1914.				. 1,53
1900	)					4,894					
1901						5,368	1916.				
	2					6,026	1917.				. 97
1903						5,652	1918.				
	1					3,832	1919.				. 68
1905	5					4,388					
	5					5,623					
1907						5,212	1922.				
1908	3					3,214	1923.				. 42

of new territory. Approximately 128 miles of line were abandoned during the year, on 92 miles of which the track has been taken up. This mileage was abandoned by the Canadian National and is presumably one of the results of the consolidation.

As stated earlier, the construction of second track increased greatly over recent years. In this respect, California was also in the lead, as it was with first track; 111.83 miles of new second track was built which, with the 84.22 miles of first track, made a total of 196.05 miles of track completed in that state during the year. Contrary to the general tendency in first track construction, the building of second track was generally in large units, varying from stretches of from 40 miles up to 117 miles, the latter figure being that for the Atchison, Topeka & Santa Fe from Louise, Ariz., to Daggett, Cal. Arizona was second and Illinois third with second track mileages of 89.49 and 60.97 respectively. The greatest amount built by any one road was by the Santa Fe, which constructed a total of 201.79 miles, or but little less than one-third of the total second track for the country during 1923. Considerable mileage was also built by the Great Northern, the Chicago, Terre Haute & Southeastern, the Southern Pacific and the Union Pacific.

Construction other than track during the past year was chiefly of a nature which would effect operating improvements and, although greater than it has been for a number of years, is still presumably less than is actually needed.

Terminal improvements received a large amount of attention, the items showing a wide range of this class of work throughout the country and covering in detail such features as engine-house extensions, machine shops, power plants, new yards, additions to existing yards, freight houses and freight-house extensions. Grade and line revision also formed an important part of the year's work, in connection with which there was some grade separation work of varying magnitude. The outstanding project of the year from an operating standpoint was the Castleton cut-off of the New York Central, which will involve an ultimate expenditure of approximately \$20,000,000. This project includes a high level bridge over the Hudson river, a large freight yard with separate facilities for fast and slow freight, and a number of double-track connections to the New York Central proper, the West Shore and the Boston & Albany. The Pennsylvania resumed its widespread improvement program and carried forward a larger number of projects of an operating nature than it has for a number of years, most of which were located in the eastern and central regions.

Other roads throughout the country were likewise extremely active, with the result that taking the statistics as a whole, it is fairly evident that the railways have made a big step toward the prosecution of a more normal and stable improvement program and one that is likely to continue, baring such contingencies as bad business conditions and unwise legislation, for a great many years.

Although not unexpected, it is somewhat interesting to observe that the work of the eastern roads dealt chiefly with such projects as extensions and improvement to freight terminals, sidings and yards, grade separation, short cut-offs and short sections of additional multiple track, while that of the western roads involved a large amount of second track development work, grade and line revision and reconstruction in conjunction with terminal improvements, the latter class of work being carried out on practically all roads.

The weeding out of the uneconomic short lines and branches of the larger roads was still in effect in 1923 although not on such a large scale as in the previous years. The mileage abandoned and taken up (128.82 miles) during 1923 was about one-half of that for 1922, 1921 and 1920 and about one-fourth or less than that for 1919 and 1918. Mileage abandoned and not taken up (384.13 miles) was about one-fifth of that for 1921 and in general considerably less than that for 1922 and the preceding years other than 1921. In a way, this decline in the amount of mileage abandoned may be attributed to the slightly better conditions which the short lines and branches are facing today and to the fact that a great number of the most uneconomic lines have already been abandoned. Some few of these almost destitute roads have found relief by the installation of gasoline-operated motor cars which seem to be particularly well fitted for this field of railway operation. Given a fairly generous adoption of this class of equipment by the smaller roads in the poorer territories and also by the large roads on their less productive branches, there seems to be a reasonable hope of retaining much of the remaining short lines and branch lines which are still on the border of financial ruin, although many will doubtlessly be abandoned from time to time in the future because of the changed conditions of the territories which they serve.

## Railroad Construction in the United States in 1923

#### Alaska Railroad

First Track: Seward, Alaska, to Fairbanks, 64 miles.

Important Work Undertaken: New terminal at Fairbanks, cost \$200,000 (completed).

#### Alexandria & Western

First Track: McFarland, La., to Dycers Creek, 0.2 miles.

Important Work Undertaken: New road from Dycers Creek, La., to Pit
Junction, 4 miles. Extension of gravel pit on line, cost \$150,000 (65 per cent completed).

#### Alton & Southern

Important Work Undertaken: Building new line from Litchfield & Madison crossing to St. Louis, Springfield & Peoria, 2 miles. New line under survey from St. Louis, Springfield & Peoria, to Mitchell, Ill., 4 miles.

#### Ann Arbor

Second Track: In Michigan, 5 miles.

### Arizona Eastern

Important Work Undertaken: Union passenger station with the Atchison, Topeka & Santa Fe at Phoenix, Ariz., cost \$600,000 (completed).

#### Atchison, Topeka & Santa Fe

First Track: Owen, Okla., to Pawhuska, 6.21 miles.

Second Track: Dalies, N. M., to Rio Puerco, 7.90 miles. Perea, N. M., to Defiance, 23.33 miles. Yampai, Ariz., to Hackberry, 37.13 miles. Louise, Ariz., to Arizona-California state line, 52.36 miles. Arizona-California state line to east of Daggett, Cal., 65.1 miles. Kern Jct., Cal., to Bakersfield, 2:89 miles. Mission, Kan., to Burrton, 13.08 miles.

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Third Track: Emporia, Kan., to Plymouth, 5.98 miles.

Important Work Undertaken: New line from Ellinor, Kan., to Eldorado, 52.43 miles.

#### Atlantic Coast Line

Second Track: In South Carolina, 39 miles. In Georgia, 23 miles. In Florida, 4 miles.

Important Work Undertaken: Grade reduction at Kelford, N. C., cost \$109,000 (85 per cent completed). Car repair yard and shed at Sanford, Fla., cost \$112,000 (completed). Extension of coach repair shed at Way-cross, Ga., cost \$112,600 (90 per cent completed). New coach and paint shops at Rocky Mount, N. C., cost \$460,000 (25 per cent completed). New shop facilities at Montgomery, Ala., cost \$420,000 (10 per cent completed).

#### Baltimore & Ohio

Baltimore & Ohio

Second Track: From Webster, W. Va., to Brydon, 3 miles,
Important Work Undertaken: Building new line from Milvale, Pa., to
Ethon, 1 mile. Track elevation at Philadelphia, Pa., initial appropriation
\$\frac{\$1,000,000}\$ (33 per cent completed). Grain elevator at Baltimore, Md., cost
\$\frac{\$5,555,000}\$ (30 per cent completed). New office building at Mt. Clare shops,
Baltimore, cost \$201,500 (80 per cent completed). Construction of Pier 3
and repairs to Pier 5 at Locust Point, Md., cost \$3,600,000 (10 per cent
completed). Bridge renewals in Valley Railroad of Virginia, cost \$311,000
(70 per cent completed). Grade separation at Martinsburg, W. Va., cost
\$245,000 (20 per cent completed). Addition of new retort to timber treating plant at Green Springs, W. Va., cost \$115,000 (completed). Engine
terminal improvements at Grafton, W. Va., cost \$400,000 (completed). Reconstruction of bridge over Kanawha river at Parkersburg, W. Va., cost
\$476,000 (10 per cent completed). Bridge renewals from Benwood to Fairmont, W. Va., cost \$160,000 (completed). Tunnel renewals, Kingsville,
W. Va., cost \$112,000 (10 per cent completed). Bridge renewals from
Rand to Claysville, Pa., cost \$225,000 (completed). Bridge renewals from
Valley Grove to Tridelphia, W. Va., cost \$129,000 (completed). Bridge
renewals at Cincinnati, Ohio, cost \$170,000 (10 per cent completed). Bridge
renewals at Cincinnati, Ohio, cost \$170,000 (10 per cent completed). Track
elevation at Chicago, cost \$400,000 (60 per cent completed).

#### Beaver Meade & Englewood

Important Work Undertaken: New line under survey from Forgan, Okla., to Hooker, 40 miles.

#### Bessemer & Lake Erie

Important Work Undertaken: Widening channel and constructing new dock front at Conneaut Harbor, Ohio, cost \$916,600 (4 per cent completed). Highway improvement and grade elimination projects at Osgood, Pa., cost \$120,000 (60 per cent completed). Change of line from Pardoe, Pa., to Coolspring, cost \$310,000 (65 per cent completed). Change of line from Culmerville, Pa., to Refractories, cost \$127,500 (50 per cent completed). Rebuilding yard and eliminating grade crossing near Rural Ridge, Pa., cost \$219,600 (10 per cent completed).

#### Bingham & Garfield

Second Track: In the vicinity of Bingham, Utah, 0.75 miles.

Important Work Undertaken: Additions to load and empty yards, Magna,
Utah, cost \$175,000 (80 per cent completed).

## Birmingham Belt

Important Work Undertaken: New engine terminal at East Thomas, Birmingham, Ala., cost \$636,600 (70 per cent completed).

#### Boston & Maine

Important Work Undertaken: Rebuilding superstructure of bridge No. 6 at East Cambridge, Mass., cost \$150,000 (20 per cent completed). New double-track, steel bridge over the Merrimack river at Newburyport, Mass., cost \$275,000 (completed). New locomotive repair shop, 170 ft. by 200 ft., at Concord, N. H., cost \$310,000 (78 per cent completed). Installing a new timber treating plant and tie yard at Nashua, N. H., cost \$228,000 (96 per cent completed).

## Buffalo, Rochester & Pittsburgh

First Track: Kent, Pa., to end of branch, 1.97 miles.

Important Work Undertaken: Renewal of timber bridges with concrete or steel or filling in, cost \$107,000 (completed). Double-track steel bridge at Warsaw, N. Y., cost \$100,000 (completed). New ash handling facilities, inspection pits and other terminal improvements at East Salamanca, N. Y., cost \$175,000 (completed). Additional yard tracks, new storehouses, shop buildings and other improvements at Cloe, Pa., cost \$123,000 (completed). Additions to earth dam, concrete core wall and spillway to provide additional water storage at Cloe. Pa., cost \$100,000 (completed). Reconstructing or replacing 17 steel bridges, Punxsutawney, Pa., to Echo, cost \$300,000 (90 per cent completed).

#### Carbon County Railroad

First Track: Columbia, Utah, to Columbia Jct., 4.79 miles.

#### Carlton & Coast

First Track: In Oregon, 2 miles.

#### Central of Georgia

Important Work Undertaken: New steel and concrete bridges along line, cost \$250,000 (25 per cent completed). Improvements to water service, cost \$100,000 (50 per cent completed).

## Central of New Jersey

Important Work Undertaken: Paving driveway in Jersey City, N. J., yards, cost \$205,000 (completed). New Bridge over Newark Bay, cost

\$12,000,000 (5.6 per cent completed). Grade crossing elimination, new engine terminal, etc., at Somerville, N. J., cost \$2,000,000 (5 per cent completed). Renewal of bridge No. 58, track changes and new interlocking in the vicinity of Mauch Chunk, Pa., cost \$780,000 (completed).

#### Cheat River Railroad

First Track: Erwin, W. Va., to Hannahsville, 5 miles.

Important Work Undertaken: Building from Hannahsville, W. Va., to St. George, 11 miles.

#### Chesapeake & Ohio

Chesapeake & Ohio

First Track: In West Virginia, 2.2 miles.

Second Track: From Big Sandy Jct., Ky., to Hampton, 1.08 miles.

Third Track: From Catlettsburg, Ky., to Ashland, 2.39 miles.

Important Work Undertaken: New freight depot at Norfolk, Va., cost \$155,650 (99 per cent completed). New storage yard at Newport News, Va., cost \$380,000 (74 per cent completed). New freight terminal at Clifton Forge, Va., cost \$468,000 (86 per cent completed). Extension of sidings at various positions on the line, cost \$720,000. New Yard at Hinton, W. Va., cost \$240,070 (99 per cent completed). Extension of storehouse at Huntington, W. Va., cost \$103,400 (98 per cent completed). Additional yard and other tracks at Sproul, W. Va., cost \$145,100 (88 per cent completed). Additional yard tracks at Peach Creek, W. Va., cost \$159,600 (completed). Three 100-car yard tracks at Taplin, W. Va., cost \$104,000 (90 per cent completed). Passenger station, third main track, yard and other tracks at Ashland, Ky., cost \$2,443,100. Second track under construction from Hampton, Ky., to Lockwood, cost \$416,000. Second track under construction from Buffalo Tunnel, Ky., to Auxier, cost \$20,000. Second track at West Buffalo, Ky., classification yard, cost \$425,000 (70 per cent completed). Second track under construction from Robbins, Ohio, to Gregg, cost \$102,500 (19 per cent completed). Additional yard tracks at Handley, W. Va., and Whitesville, W. Va., cost \$242,500 (completed). Filling in bridge and changing channel of creek at Maysville, Ky., cost \$102,700 (completed). Superstructure renewal at Covington, Ky., cost \$210,500 (completed). Addition to roundhouse at Peach Creek, W. Va., cost \$100,000 (completed). New line under survey from Ronceverte, W. Va., to Rainelle, 35 miles. New line under survey from Valley Crossing, Ohio to Gregg, 63 miles.

#### Chicago & Alton

Second Track: In Illinois, 9 miles.

Important Work Undertaken: Building second main track and revision of grades to a maximum of 6.3 per cent between Godfrey, Ill., and Plainview, Ill., 18 miles (70 per cent completed).

#### Chicago & Eastern Illinois

Important Work Undertaken: Replacing steel bridges along line, cost \$200,000 (completed). Purchase of property for new terminal at Evansville, Ind., cost \$175,000 (80 per cent completed).

#### Chicago & North Western

Chicago & North Western

Second Trach: From Radnor, Ill., to Limestone, 5.11 miles.

Third Track: From Elmhurst, Ill., to West Chicago, 3.65 miles.

Important Work Undertaken: Track elevation and other improvements at Clinton, Ia., cost \$598,000 (completed). Construction of viaduct over Chicago & North Western and Soo Line tracks at Ironwood, Mich., cost \$100,000 (completed). Two mechanical coaling chutes at Chicago shops, cost \$95,000 (completed). New engine terminal at Madison, Wis., cost \$540,000 (90 per cent completed). Ten-stall addition and extension of present enginehouse, including several terminal changes at Casper, Wyo., cost \$238,000 (90 per cent completed). Grade reduction at Fetterman, Wyo., and Irvine, cost \$115,000 (completed). Rebuilding steel superstructure of bridge over Missouri river at Blair, Nebr., cost \$558,000 (10 per cent completed). Track depression and construction of new depot at Layton Park, Milwaukee, Wis., cost \$2,000,000 (90 per cent completed). New subway at Ogden avenue, Chicago, cost \$193,330 (85 per cent completed).

#### Chicago, Burlington & Quincy

Second Track: Woodlawn, Ill., to Waltonville, 8.03 miles. Reno, Ill.,

Second Track: Woodlawn, Ill., to Waltonville, 8.03 miles. Reno, Ill., to Ayers, 5.23 miles.

Important Work Undertaken: New line 18 miles long with maximum grade of 0.25 per cent from Vermont, Ill., to Frederick, cost \$2,500,000 (10 per cent completed). Realinement and elevation of main tracks through city at Aurora, Ill., cost \$5,000,000 (95 per cent completed). Construction of two-mile extension of coal mine tracks at Kirby, Wyo., cost \$100,000 (75 per cent completed). New locomotive repair shops, tracks, etc., at Denver, Colo., cost \$2,000,000 (90 per cent completed). Installation of new turntables along line, cost \$97,000 (completed). Engine terminal improvements at various points, cost \$464,000 (95 per cent completed). New water treating plants at points along line, cost \$173,000 (75 per cent completed). New passenger stations and improvements, cost \$130,000 (95 per cent completed). Improvements to tie treating plant at Sheridan, Wyo., cost \$130,000 (completed).

#### Chicago, Indianapolis & Louisville

Important Work Undertaken: Elevation of freight house, yard, team tracks, etc., in vicinity of New Jersey street, Indianapolis, Ind., cost \$500,000 (10 per cent completed).

## Chicago, Milwaukee & Gary

First Track: At Momence, Ill., 0.5 miles.

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## Chicago, Milwaukee & St. Paul

First Track: In St. Paul, Minn., 4.4 miles.
Important Work Undertaken: Track elevation on Chicago and Evansson division at Chicago, \$300,000 (completed).

#### Chicago, Rock Island & Pacific

Second Track: Bishop, Kan., to Paxico, 21.5 miles.

Important Work Undertaken: Building new line from Latimer, Kan., to Herington, 3.5 miles. Reconstructing bridge at Rock Island, Ill., cost \$120,000 (completed). New passenger station at Moline Ill., cost \$100,000 (completed). Reconstructing bridge at Eldon, Iowa, cost \$106,000 (30 per cent completed). Installing storage and roadside locomotive fuel oil tanks on Arkansas-Louisiana division, cost \$225,000 (completed).

#### Chicago, St. Paul, Minneapolis & Omaha

Important Work Undertaken: Highway bridge of steel and concrete over White Bear avenue, St. Paul, Minn., cost \$100,000 (completed).

## Chicago, Terre Haute & Southeastern

First Track: Near Delmar, Ill., 0.93 miles.

Second Track: Tallmadge, Ill., to Webster, 20.8 miles. West Dana, Ind., to Bradshaw, 12.7 miles.

#### Cleveland, Cincinnati, Chicago & St. Louis

Important Work Undertaken: 3.5-mile cut-off near Delaware, Ohio, cost \$413,390 (65 per cent completed). Additions to Sharon yard, Sharonville, Ohio, cost \$824,100 (50 per cent completed). Second track and 14.7 miles of grade and line revision, Mix, Ohio, to Lamb, cost \$4,217,700 (70 per cent completed). Grade separation at Hillsboro, Ill., cost \$100,000 (40 per cent completed). Grade separation at Indianapolis, Ind., cost \$1,447,800 (94 per cent completed).

PEORIA & EASTERN.—Renewal of 1,285-ft. long, 70-ft. high, steel viaduct near Danville, Ill., cost \$303,300 (masonry 50 per cent completed). Renewal of Wabash river bridge near Covington, Ind., cost \$197,700 (masonry 95 per cent completed).

#### Colorado & Southern

Important Work Undertaken: Reconstruction of 16 stalls and addition of 10 stalls to enginehouse at Trinidad, Colo., cost \$150,000 (completed).

#### Delaware & Hudson

Second Track: Falcour, N. Y., to South Jet., 0.43 miles.

#### Delaware, Lackawanna & Western

Delaware, Lackawanna & Western

Third Track: Newark, N. J., to Orange, 1.61 miles.

Important Work Undertaken: Grade elevation, additional main track, new passenger stations, etc., in the vicinity of East Orange, N. J., cost \$4,200,000 (completed). Grade crossing elimination, Clifton, N. J., cost \$100,000 (90 per cent completed). Grade crossing elimination, Little Falls, N. J., cost \$140,000 (80 per cent completed). Grade crossing elimination, Newark, N. J., cost \$170,000 (50 per cent completed). Construction of new third and fourth track, Lincoln Park to Boonton, N. J., cost \$800,000 (40 per cent completed). Grade crossing elimination, Delavan and Kensington avenues, Buffalo, N. Y., cost \$330,000 (90 per cent completed). Renewal of four truss spans, including reconstruction of piers, new bridge seats and wing walls, Buffalo, N. Y., cost \$175,000 (completed).

## Denver & Rio Grande Western

Important Work Undertaken: Shop improvements at Burnham, Colo., cost \$886,000 (28 per cent completed). Shop improvements at Salida, Colo., cost \$342,000 (65 per cent completed). Shop improvements at Grand Jct., Colo., cost \$242,000 (70 per cent completed). Shop improvements at Alamosa, Colo., cost \$158,400 (75 per cent completed). Shop improvements at Salt Lake, Utah, cost \$1,167,000 (35 per cent completed).

## Denver & Salt Lake

Important Work Undertaken: Tunnel through James Peak (Moffat tunnel) in Colorado, 6.04 miles, estimated cost \$6,720,000.

## Detroit & Mackinac

Important Work Undertaken: Building new line from Alpena, Mich., to Rockport, 12.1 miles.

## Detroit Terminal

Second Track: In Michigan, 2.33 miles.

Important Work Undertaken: New second track in Michigan, 0.7 miles.

Eight-stall addition to engine house, including new machine shop and storehouse facilities at Davidson yard, Detroit, Mich., cost \$115,000 (com-

### Duluth & Iron Range

Important Work Undertaken: Replacing timber pocket linings with steel and concrete on ore focks at Two Harbors, Minn., \$350,000 (25 per cent

#### Electric Short Line

First Track: Hutchinson, Minn., to Lake Lillian, 28 miles.

#### Elgin, Joliet & Eastern

Second Track: Jeliet, Ill., to Coynes, 2.18 miles.
Important Work Undertaken: Fourteen-stall addition to reinforced concrete roundhouse at East Joliet, Ill., cost \$183,279 (completed). Steel car repair shop, 500 ft. long by 300 ft. wide, at East Joliet, cost \$577,422 (85 per cent completed). Other yard facilities at East Joliet, cost \$140,790

(completed). Twenty-stall addition to enginehouse at Kirk yard, Gary, Ind., cost \$269,761 (completed). Revision of grade in conjunction with construction of second track near Joliet, Ill., cost \$272,533 (completed).

#### Erie Railroad

Second Track: At Akron, Ohio, 0.57 miles.

Important Work Undertaken: Reconstruction of Pier B as an open pier, at Weehawken, N. J., cost \$182,000 (completed). Reconstruction of Pier C as a two-story combined pier and warehouse, at Weehawken, cost \$635,000 (completed). Adding a 107-ft. by 410-ft. extension to erecting shop, installation of 250-ton gap crane, etc., at Hornell, N. Y., cost \$560,000 (95 per cent completed). Grade crossing elimination covering about one mile of line at Jamestown, N. Y., cost \$753,536 (43 per cent completed). Grade crossing elimination at Buffalo, N. Y., cost \$460,000 (85 per cent completed). Construction of one-story frame extension to present Pier A at Undercliff, N. J., cost \$104,250 (completed). New freight and passenger station at Englewood, N. J., cost \$132,000 (40 per cent completed). Undertaken: Reconstruction of Pier B as an open pier. Important Work

#### Florida East Coast

First Track: From Okeechobee, Fla., to a point south, 10 miles.

Important Work Undertaken: New line from Okeechobee, Fla., to St.

Lucie canal, 24.1 miles. New line under project from St. Lucie canal to Lemon City and Larkin, Fla., 110.9 miles. New passenger station at Daytona, Fla., cost \$100,000 (75 per cent completed). Unit No. 2 of the general office building at St. Augustine, Fla., cost \$160,000 (completed). New retaining wall, 2,074 ft. long at Toms Harbor, Fla., cost \$90,000 (completed). Rebuilding existing single-track bridge to double track, M-46 loading, with 216-ft. bascule draw span at Jacksonville, Fla., cost \$1,800,000 (1 per cent completed). New engine terminal facilities at New Smyrna, Fla., cost \$165,000 (15 per cent completed).

## Genesee & Wyoming

Important Work Undertaken: New freight classification yard at Retzof, N. Y., \$150,000.

#### Georgia & Florida

Important Work Undertaken: Grade and line revision from Keesville, Ga., to St. Clair, 5.22 miles (completed).

#### Great Northern

Great Northern

Second Trach: Atwater, Minn., to Kandiyohi, 7.41 miles. Wheelock, N. D., to Spring Brook, 10.98 miles. Java, Mont., to Nyack, 18.98 miles. Important Work Undertaken: New engine terminal at St. Cloud, Minn., cost \$410,000 (completed). Engine terminal at Fargo, N. D., cost \$185,000 (completed). New engine terminal at Watertown, S. D., cost \$75,000 (completed). Replacing turntable at four different points on system, cost \$124,920 (completed). Extension to passing tracks between Minnaepolis, Minn., and Breckenridge, cost \$123,500 (completed). Extension of yard tracks at various points, cost \$65,500 (completed). Car repair shop at St. Paul, Minn., cost \$117,900 (completed). New freight house at Wenatchee, Wash., cost \$99,475 (completed). Extension to car repair shop and the construction of a lumber shed at St. Cloud, cost \$125,200 (completed). New timber and concrete snow shed at Java, Mont., cost \$159,000 (completed). Renewal, reconstruction and replacement of bridges and trestles along line, cost \$654,730 (completed). Change of line and new second track in vicinity cost \$654,730 (completed). Change of line and new second track in vicinity of Talbot, Mont., cost \$445,300 (work started). Replacing timber ore dock No. 2 with steel and concrete dock at Allouez, Wis., cost \$2,605,000 (com-

#### Great Southern

Important Work Undertaken: New line under survey from Friend, Ore., to White River, 30 miles.

## Gulf & Ship Island

Important Work Undertaken: New enginehouse and other shops at Gulf-ort, Miss., cost \$90,000 (completed). New warehouse with conveying machinery, etc., at Gulfport, cost \$95,000 (completed).

## Gulf Coast Lines

First Track: In Texas, 1.24 miles.

#### High Point-Thomasville & Denton

Important Work Undertaken: Rehabilitating 35 miles of line of the old Carolina & Yadkin from High Point, N. C., to High Rock, cost \$200,000 (50 per cent completed). No mileage in operation yet.

## Illinois Central

Illinois Central

Second Track: Clinton, Ill., to Salt Creek siding, 2.24 miles. Springfield, Ill., to Spaulding, 7.99 miles. Clarks, Ky., to Tennessee river, 11 miles. Third Track: Kankakee, Ill., to Otto, 4.87 miles.
Fourth Track: Matteson, Ill., to Monee, 0.19 miles.
Fifth Track: Highlawn, Ill., to Calumet, 5 miles.
Important Work Undertaken: New yards, shops and engine terminal facilities at Markham yard near Homewood, Ill., cost \$8,793,000 (50 per cent completed). Grade revision in connection with electrification project at Chicago, cost \$4,076,000 (60 per cent completed). Grade separation at Riverdale, Ill., cost \$854,000 (50 per cent completed). Grade separation and track elevation at Harvey, Ill., cost \$1,486,000 (70 per cent completed). Grade reduction and track elevation and construction of passenger station, division office building, etc., at Champaign, Ill., cost \$1,107,000 (50 per cent completed). Grade reduction over 6.39 miles at Magnet Hill near Mattoon, Ill., cost \$590,000 (90 per cent completed). Grade reduction over 1.3 miles at Alma, Ill., cost \$113,000 (completed). Change of alinement, grade separation and construction of new yard tracks, rearrangement of mechanical facilities and other improvements at Central City, Ky., cost \$1,636,000 (50 per cent completed). Additional yard facilities at Champaign,

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cost \$106,000 (completed). New passing tracks and coaling facilities at Gilman, Ill., cost \$174,000 (65 per cent completed). Rearrangement and extension of yard tracks at Mounds, Ill., cost \$300,000 (80 per cent completed). Additional tracks and coaling facilities at East St. Louis, Ill., cost \$130,000 (60 per cent completed). Additional yard facilities at Frogmoor, Tenn., cost \$171,600 (completed). New engine terminal and reconstruction of yard at Council Bluffs, Ia., cost \$276,000 (90 per cent completed). Additional yard tracks at East St. Louis, cost \$274,000 (60 per cent completed). Reconstructing Stuyvesant docks and levee at New Orleans, La., cost \$379,500 (80 per cent completed). New water treating plant in shops at Clinton, Ill., cost \$105,000 (completed).

#### Indiana Harbor Belt

Third Track: Melrose Park, Ill., to La Grange, 3.4 miles.
Important Work Undertaken: Additional yard tracks and facilities at Blue
Island, Ill., cost \$250,000 (2 per cent completed). Construction of additional train, repair and classification tracks at Norpaul yard, Ill., cost
\$285,000 (35 per cent completed).

#### Indianapolis Union Railway

Second Track: In the city of Indianapolis, Ind., 0.19 miles. Third Track: In the city of Indianapolis, 0.24 miles. Fourth Track: In the city of Indianapolis, 0.06 miles.

#### Interstate Railroad

First Track: Ramsey, Va., to Miller yard, 14.5 miles. Arno, Va., to Derby, 1.5 miles.

#### Jackson & Eastern

Important Work Undertaken: Building new line from Walnut Grove, Miss., to Tuscola, 5 miles. New line under survey from Tuscola, Miss., to Jackson, 45 miles.

#### Kansas & Oklahoma

First Track: Liberal, Kan., to Oklahoma state line, 4 miles.
Important Work Undertaken: New line under survey from Woods, Kan., to Hughton, 14 miles.

#### Kansas City Southern

Important Work Undertaken: Renewal or Arkansas river bridge at Redland, Okla., cost \$200,000 (94 per cent completed). Extensions to machine shop, 152 ft. by 252 ft., at Pittsburg, Kan., cost \$250,000 (completed). Extension to enginebouse, 8-stalls, at Pittsburg, cost \$120,000 (30 per cent completed).

#### Kansas City Terminal

Important Work Undertaken: New passenger station, Kansas City, Kan, cost \$100,000 (95 per cent completed). Reinforced concrete viaduet, Kansas City, Mo., cost \$140,000 (20 per cent completed).

## Kansas, Oklahoma & Gulf

Important Work Undertaken: Building new line from Baxter Springs, Kan., to Military Jct., 6.25 miles.

#### Kentucky & Tennessee

First Track: From Gregory, Ky., to Bell Farm, 2.5 miles.

#### Lake Erie & Western

Important Work Undertaken: Grade separation at Lima, Ohio, cost \$225, 000 (75 per cent completed).

#### Lake Superior & Ishpeming

Important Work Undertaken: New car shops, paint shop, etc., at Presque Isle, Mich., cost \$197,000 (completed).

#### Lehigh & New England

Important Work Undertaken: Grading and laying tracks for new engine terminal, 10-stall engine house, coaling station, etc., including revision of main track, at Tamaqua, Pa., cost \$227,000 (75 per cent completed). Building facilities, etc., for Tamaqua terminal to be started in 1924, estimated cost \$235,000. Grade reduction, vicinity of Quarry Junction, Pa.. cost \$150,000 (90 per cent completed).

## Lehigh Valley

Important Work Undertaken: Completion of first unit of the Claremont deep water terminal, including a freight house and unloading equipment at Jersey City, N. J. (completed).

## Long Island Railroad

Important Work Undertaken: Changing from two to four-track systems and grade elimination in Borough of Queens, New York, cost \$2,500,000 (50 per cent completed). Grade crossing elimination at Richmond Hill, N. Y., cost \$525,000 (90 per cent completed).

#### Longview, Portland & Northern

First Track: Longview, Wash., to Longview Jct., 3 miles.
Important Work Undertaken: Building new line from Longview to Ryderwood, 26.5 miles.

## Los Angeles & Salt Lake

First Track: Lund, Utah, to Cedar City, 33.12 miles.

Important Work Undertaken: New line under project from Anaheim,
Cal., to Santa Ana, 8 miles. New yard tracks and additional right-of-way
at Provo, Utah, cost \$128,000 (completed). New two-story station building
at Milford, Utah, cost \$153,000 (completed). Purchase of real estate and
uncompleted hotel building and completion of the hotel, etc., at Cedar City,

Utah, cost \$264,000 (90 per cent completed). Enlarging section and lining tunnels Nos. 13 and 14 with concrete, Big Springs, Nev., to Minto, cost \$200,000 (20 per cent completed). New freight house, island platforms, etc., at Los Angeles, Cal., cost \$153,000 (completed). New terminal facilities, including freight yards, enginehouse, shops, at Los Angeles, cost \$1,750,000 (75 per cent completed).

#### Louisiana & Arkansas

Important Work Undertakes: New shops and yards at Minden, La., cost \$700,000 (90 per cent completed).

#### Louisiana Railway & Navigation

Important Work Undertaken: New passenger station at New Orleans, La., cost \$250,000 (20 per cent completed).

#### Louisville & Nashville

Second Track: Perritt, Ky., to Typo, 6 miles. Baileys, Ky., to Wallsend,

15 miles.

Important Work Undertaken: Rigolets bridge, 30 miles from New Orleans, La., cost \$3,128,000 (40 per cent completed). Revision of line, construction of high fills to replace bridges, south of Louisville, Ky., cost \$507,000 (10 per cent completed). Reconstruction of Newport and Cincinnati bridge, Cincinnati, Ohio, cost \$369,000. Construction of Gouble-track, 600-ft. bridge at Lebanon Junction, Ky., cost \$429,000 (30 per cent completed). New machine shop at Etowah, Tenn., cost \$252,255. New machine shop at Corbin, Ky., cost \$331,906. New passenger station at Bowling Green, Ky., cost \$169,401. New freight warehouse at New Orleans, cost \$550,000.

#### Magma Arizona

Important Work Undertaken: Narrow gage line 30 miles long from Magma, Ariz., to Superior, abandoned and 30 miles of standard gage constructed (completed).

#### Maine Central

Important Work Undertaken: Replacement of steel bridge at Brunswick, Me., cost \$207,000 (32 per cent completed).

#### Marion & Eastern

First Track: Scranton Junction, Ill., to connect with the Missouri Pacific. 4 miles.

#### Michigan Central

Second Track: Jackson, Mich., to Rives Jct., 10.62 miles.

Important Work Undertaken: New enginehouse at Grand Rapids, Mich., cost \$110,000 (completed). New coding and water supply stations at Augusta, Mich., cost \$167,500 (completed). Building northbound unit of new freight yard at North Toledo, Ohio, cost \$1,750,000 (80 per cent completed). New interchange yard at Hartsdale, Ind., cost \$107,000. Grade crossing elimination work at West Detroit, Mich., cost \$600,000 (10 per cent completed). New engine terminal facilities at Lansing, Mich., cost \$178,000 (completed). Completing remaining work at the Niles, Mich., engine and freight terminal, cost \$545,000 (completed). Building a new double-track bridge over the Niagara river at Niagara Falls, Canada, cost \$1,797,500 (45 per cent completed). Extending yard tracks and construction of a subway at St. Thomas, Ont., Canada, cost \$186,000 (completed).

#### Minarets & Western

First Track: In California, 36.45 miles.

#### Minneapolis, St. Paul & Sault Ste. Marie

Important Work Undertaken: New 20-stall engine house, machine shop and other terminal facilities at Gladstone, Mich., cost \$151,500 (completed).

#### Mississippi Central

Important Work Undertaken: Grade reduction and curve elimination near Hattiesburg, Miss., cost \$100,000 (10 per cent completed).

#### Mississippian Railway

First Track: Amory, Miss., to Smithville, 9 miles. Important Work Undertaken: Building new line, Smithsville, Miss., to Fulton, 16 miles.

#### Missouri-Illinois

Important Work Undertaken: Channel and harbor improvements on Mississippi river at St. Genevieve, Mo., cost \$110,000 (completed).

## Missouri, Kansas & Texas

Missouri, Kansas & Texas

Important Work Undertaken: New freight terminal, enginehouse facilities and grade separation at Denison, Tex., cost \$3,200,000 (completed). New locomotive repair shop, office buildings, machinery, etc., at Waco, Tex., cost \$1,500,000 (completed). New freight station at Waco, Tex., cost \$180,000 (completed). Six-stall addition to roundhouse, new power house and hotel at New Franklin, Mo., cost \$220,000 (completed). Reduction of curvature from St. Louis, Mo., to New Franklin, cost \$100,000 (completed). Installation of water treating plant on system, cost \$200,000 (completed). Bridge renewals on system, cost \$120,000 (15 per cent completed). New concrete trestle at Forreston, Tex., cost \$90,000 (completed). New concrete grain elevtator of 1,000,000 bu. capacity, yard tracks, etc., at Rosedale, Kan., cost \$525,000 (completed). Rearrangement and enlargement of car repair shops at Denison, Tex., cost \$330,000 (40 per cent completed).

#### Missouri Pacific

First Track: In Wichita, Kan., 0.08 miles. In Belle Plaine, Kan., 0.13

Important Work Undertaken: New grain elevator at St. Louis, Mo., cost \$1,250,000 (completed). New shop facilities at St. Louis, cost \$645,000

(completed). New hospital at St. Louis, cost \$1,000,000 (completed). New hospital at Little Rock, Ark., cost \$500,000 (5 per cent completed). Filling in high timber trestles on White River division, cost \$250,000 (62 per cent completed). Strengthening bridges on system, cost \$1,300,000 (54 per cent completed). Installation of fuel oil handling facilities on southern district, cost \$300,000 (completed). Reconstruction of Bridge 31 at Osage, Mo., cost \$292,000 (57 per cent completed). Strengthening, raising and extending bridge at Kansas City, Kan., cost \$250,000 (80 per cent completed). Track elevation and trestle construction at Corning, Ark., cost \$250,000 (90 per cent completed). New machine shop at Wichita, Kan., cost \$135,000 (completed). (completed).

#### Mobile & Ohio

Important Work Undertaken: New engine terminal including 24-stall roundhouse, 500-ton concrete coaling plant, cinder conveyors, etc., at Iselin, Tenn., cost \$320,000 (50 per cent completed).

#### Monongahela Railway

Second Track: Luzerne, Pa., to East Rices Landing, 5.88 miles.

#### Montour Railroad

Important Work Undertaken: New freight yard at Coraopolis, Pa., cost \$300,000 (35 per cent completed).

#### Mt. Tamalpais & Muir Woods

ortant Work Undertaken: Combined hotel and station at Mt. Tamalpais, Cal., cost \$75,000.

#### Nashville & Atlantic

First Track: In Tennessee, 1.6 miles.

#### Nashville, Chattanooga & St. Louis

Important Work Undertaken: Reinforced concrete, brick and terra cotta, 8-story office building, Nashville, Tenn., cost \$227,500 (50 per cent completed). New station and office building at Paducah, Ky., cost \$108,295 (20 per cent completed). (Land values not included in either of the above

#### New Jersey, Indiana & Illinois

Important Work Undertaken: New engine terminal and facilities, cost

#### New Orleans Public Belt

First Track: In New Orleans, La., 11.24 miles. Second Track: In New Orleans, 11.62 miles.

#### New York Central

First Track: From near Depew, N. Y., to near Bomansville, 2.14 miles. Fourth Track: East Syracuse, N. Y., to Salina Junction, 5.46 miles. Madison, Ohio, to Perry, 5 miles.
Important Work Undertaken:

Madison, Ohio, to Perry, 5 miles.

Important Work Undertaken:

Links East—Restoration of Pier 103-D on North river, New York, cost \$200,000 (completed). Substaticn equipment at 110th street, New York, cost \$390,000 (56 per cent completed). New 20,000-kw, generator for Port Morris station at New York, cost \$680,000 (15 per cent completed). Reconstruction of Morris avenue bridge, H-21, at New York, cost \$216,000 (completed). Team yard, 17th and 18th streets, New York, cost \$100,000 (60 per cent completed). Converting present tunnel into an open cut at Garrison, N. Y., cost \$300,000 (93 per cent completed). Building a retaining wall at Newburgh, N. Y., cost \$106,400 (90 per cent completed). Reconstruction of bridge at Fox Ridge, N. Y., cost \$117,500 (completed). Filling in single track treatle at Crafts, N. Y., cost \$120,000 (29 per cent completed). Highway work at Newark, N. Y., cost \$120,000 (29 per cent completed). Renewal of turntables at Buffalo, N. Y., cost \$178,000 (46 per cent completed). Building Hudson River Connecting Railroad (Castleton cut-off), cost \$18,360,000 (42 per cent completed). Additional embankment for the relocation of tracks at South Amsterdam, N. Y., cost \$289,000 (40 per cent completed). Improvement in water facilities at Wende, N. Y., cost \$108,000 (25 per cent completed).

Links West—Grade separation at Cherry street, Frie, Pa., cost \$180,000 (50 per cent completed). Grade separation at State street, Painesville, Ohio, cost \$130,000 (10 per cent completed). Reconst \$100,000 (10 per cent comp

Grade separation at State street, Painesville, Ohio, (50 per cent completed). Grade separation at State street, Painesville, Ohio, cost \$343,000 (work started). New interchange track with bridge and culvert extensions at Painesville, cost \$150,000 (5 per cent completed). Renewal of bridge at Cleveland, Ohio, cost \$150,000. Relocation of passenger station, freight house and main and yard tracks at Youngstown, Ohio, cost \$532,000 (20 per cent completed). Grade separation at Elyria, Ohio, cost \$1,795,000 (71 per cent completed). Grade separation at Toledo, Ohio, cost \$188,000 (23 per cent completed). Grade separation at Detroit, Mich., cost \$188,000 (23 per cent completed). Additional yard tracks at Elkhart, Ind., cost \$60,000 (25 per cent completed). Additional yard tracks at South Bend, Ind., cost \$143,000 (80 per cent completed). Additional yard and passing tracks at Schneider, Ind., cost \$228,000 (70 per cent completed). Additional yard and train tracks at Gibson, Ind., cost \$350,000 (30 per cent completed). New coaling facilities at Gibson, cost \$283,000 (4 per cent (50 per cent completed). completed). New coaling facilities at Gibson, cost \$283,000 (4 per cent completed). Rebuilding part of freight house and adding 90-ft. extension at Toledo, cost \$263,500 (completed).

#### New York, Chicago & St. Louis

Second Track: Ashtabula, Ohio, to Kingsville, 4.4 miles. Lorain, Ohio, to Kishmans, 1 mile. Colby, Ohio, to Green Springs, 7 miles. New Haven, Ind., to Ft. Wayne, 4 miles. Ft. Wayne, Ind., to Hadley, 5 miles. Important Work Undertaken: Building first unit of new yard tracks at

#### New York, New Haven & Hartford

Important Work Undertaken: New steel building, 40 ft. by 520 ft., for multiple-unit inspection at Stamford, Conn., cost \$110,000 (2 per cent

completed). Additional yard tracks, storehouse and transfer platform for freight terminal at Cedar Hill, Conn., cost \$833,062 (90 per cent completed). Construction of 12-stall extension to enginehouse at Cedar Hill, cost \$238,000 (60 per cent completed). New classification yard at South Worcester, Mass., cost \$178,850 (90 per cent completed). New steel bridge at Capitol avenue, Hartford, Conn., cost \$232,000 (50 per cent completed). Track changes at Auburn, R. I., cost \$226,000 (completed). Relocation of main line and construction of additional tracks at Northup avenue yard, Providence, R. I., cost \$164,500 (80 per cent completed). Construction of 12-stall brick enginehouse at Boston, Mass., cost \$162,000 (99 per cent completed). Construction of inspection pits and other attendant facilities at various terminals on the system, cost \$160,000 (95 per cent completed).

#### Norfolk & Western

Norfolk & Western

First Track: Town Hill, Va., extension, 3.33 miles.

Second Track: Bluestone, W. Va., to Ruth, 1.8 miles.

Important Work Undertaken: New terminal facilities at Hagerstown, Md., cost \$148,000 (completed). New tracks and terminal facilities at Auville, W. Va., cost \$765,000 (80 per cent completed). New assembly yard on Big Sandy line, cost \$205,000 (10 per cent completed). New 120-ton dumper and electrification of Piers 2 and 3 at Lamberts Point, Va., cost \$650,000 (95 per cent completed). Electrification work between Farm and Iaeger, W. Va., cost \$800,000 (20 per cent completed). Increasing power plant at Roanoke, Va., cost \$300,000 (50 per cent completed). Increasing power plant at Bluestone, W. Va., cost \$200,000 (25 per cent completed). Renewing and strengthening bridges in Cincinnati district, cost \$300,000 (10 per cent completed).

#### Northeast Oklahoma

First Track: Green, Kan., to Columbus, 8.18 miles. Black Eagle, Okla., Hockerville, 2 miles. In vicinity of Miami, Okla., 1 mile. to Hockerville, 2 miles.

#### Northern Pacific

Important Work Undertaken: Change of line and new bridge across the Mississippi river at Minneapolis, Minn., cost \$1,750,000 (75 per cent completed). New power plant at Glendive, Mont., cost \$147,000 (completed). Rebuilding bridge for double track at Billings, Mont., cost \$119,000 (completed). Change of line at Phileman, Mont., cost \$104,000 (completed). Construction of the Rosebud branch, Mont., to coal fields, cost \$1,570,000 (85 per cent completed). Grade separation at Minneapolis, Minn., cost \$145,000 (85 per cent completed). Sewer construction in coach yard at St. Paul, Minn., cost \$260,000 (25 per cent completed). New 28-stall enginehouse at Missoula, Mcnt., cost \$250,000 (70 per cent completed). Change of line at Tacoma, Wash., cost \$157,000 (completed).

#### Northwestern Pacific

Important Work Undertaken: New double-track trestle and bascule draw-bridge, Greenbrae, Cal., cost \$150,000 (80 per cent completed). Enlargement of single-track tunnel, 1119 ft. long, to double-track section at Greenbrae, cost \$162,000 (40 per cent completed).

#### Oklahoma & Arkansas

Important Work Undertaken: New line under construction from Day, Okla., to Kansas, Okla., 10 miles. New line under survey from Kansas, Okla., to Kenwood.

#### Oregon, California & Eastern

First Track: In Oregon, 17 miles.

#### Oregon Short Line

First Track: Ammon, Ida., to Dumas, 10.58 miles. Hammett, Ida., to Chalk-Line, 4.71 miles.

Second Track: Hammett, Ida., to Reverse, 9.7 miles.

Important Work Undertaken: New road under construction from Orchard, Ida., to Perkins, 27.78 miles, and from Nampa, Ida., to Sonna, 2.66 miles. New line under survey from Rogerson, Ida., to Wells, New., 95 miles. New two-story and basement addition to storehouse at Pocatello, Ida., cost \$153,000 (completed). Additional water storage reservoir, 2,200,000-gal. capacity, Batise Springs, Ida., cost \$100,000 (completed). New 150-ton coaling plant, etc., at Orchard, Ida., cost \$107,000 (10 per cent completed). Reconstruction of bridge over Boise river, cost \$137,000 (90 per cent completed). completed).

#### Oregon-Washington Railroad & Navigation Co.

Important Work Undertaken: Reconstruction of bridge over Chehalis river, near Galvin, Wash., cost \$171,000 (48 per cent completed). Replacing old bridge over Columbia river with modern new structure, near Kalan, Wash., cost \$1,245,900 (95 per cent completed). Replacing bridge over Yakima river, near Parker, Wash., cost \$264,000 (completed). New wharf, warehouse and grain elevator at Albina, Ore., cost \$244,000 (completed). New timber preserving plant and tie storage yard at The Dalles, Ore., cost \$465,000 (completed). Enlarging single track, 630-ft. tunnel to double track and lining with concrete, near Corbett, Ore., cost \$136,000 (completed). Construction of new special shallow deck through span bridge over North Fork Coeur d'Alene river, near Enaville, Ida., cost \$111,000 (16 per cent completed). New fuel oil stations on system, cost \$254,000 (completed).

#### Pacific Electric

Important Work Undertaken: New lines under construction in Temple, Cal., 2 miles. Reconstruction of trestles along line, cost \$410,000 (completed). Additional yard tracks and storage facilities at Los Angeles, Cal., cost \$202,000 (95 per cent completed).

#### Pacific Southwestern

First Track: Lompoc, Cal., to Whitehills, 5 miles.

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Pennsylvania System

Pennsylvania System

First Track: In Trenton, N. J., 0.75 miles. In Camden, N. J., 0.12 miles. Phoenix, Md., to Sparrows Point, 1.44 miles. Pittsburgh, Pa., to Sharpburg, 0.43 miles. In West Morrisville, Pa., 0.15 miles. In Philadelphia, Pa., 0.77 miles. Philadelphia to Chester, 0.12 miles. Near Idadan, Pa., 0.25 miles. Near Rodawy, Pa., 0.18 miles. West Rochester, Pa., to Fetterman, 4.25 miles. Powhatan, Ohio, to Marcoli, 3 miles. In Civerland, Mosier yard, 0.34 miles. Carleton, Mich., to Ecors e Jct., 19.96 miles. At Detroit, Mich., 8.99 miles. In Chicago, 0.39 miles.

Second Track: In Camden, N. J., 1.03 miles. The Near Morrisville, Colonial collicity, 1.12 miles. Kenwood, Pa., to Rochester, 4.15 miles. Pittsburgh, Pa., to Sharpsburg, 0.88 miles. In Chicago, 0.39 miles. Wights, Ohio, to Walbridge, 6.42 miles. In Chicago, 0.39 miles. Wights, Ohio, to Walbridge, 6.42 miles. In Chicago, 0.39 miles. Pittsburgh, Pa., to Sharpsburg, 0.88 miles. In Chicago, 0.39 miles. Pittsburgh, Pa., to Sharpsburg, 0.88 miles. In Chicago, 0.39 miles. Professor, 1.64 miles. In Canton, Ohio, 1.15 miles. Pittsburgh, Pa., to Sharpsburg, 1.64 miles. In Canton, Ohio, 1.15 miles. Pittsburgh, Pa., to Sanpsburg, 1.64 miles. In Canton, Ohio, 1.15 miles. Proprints Work Understates: Security of the Professor of the Profe

SOUTHWESTERN REGION—New 34-stall enginehouse, shops and other passenger engine terminal facilities at Columbus, Ohio, cost \$3,402,700 (80 per cent completed). Additional yard and car repair facilities at Grogan yard, Columbus, cost \$255,700 (completed). Track elevation at Indianapolis, Ind., cost \$780,000 (completed).

#### Pere Marquette

First Track: In vicinity of Flint, Mich., 8.2 miles.

Second Track: Detroit, Mich., to Plymouth, 15.77 miles.

Important Work Undertaken: Additional shop buildings and equipment at Grand Rapids, Mich., cost \$1,500,000 (55 per cent completed). New engine terminal, yards and facilities at Erie, Mich., cost \$2,000,000 (30 per cent completed). New engine terminal and coach yard at Detroit, cost \$1,200,000 (80 per cent completed). New freight yard tracks at Flint, cost \$100,000 (85 per cent completed).

## Philadelphia & Reading

Philadelphia & Reading

Important Work Undertaken: New ferry terminal at Camden, N. J., cost \$3,000,000 (75 per cent completed). Change of alignment, including construction of highway bridges near Ringtown, Pa., cost \$680,000 (14 per cent completed). New one-story reinforced concrete and brick oil house with complete system for storage at Reading, Pa., cost \$1,70,000 (completed). New 20-ton car dumper, Port Richmond, Pa., cost \$1,500,000 (30 per cent completed). New hill-to-hill bridge, Bethlehem, Pa., a highway grade crossing elimination project, cost to be shared locally and by the railroads affected, cost \$2,740,000 (75 per cent completed). Replacing bridge No. 8 over Susquehanna river, near Harrisburg, Pa., cost \$1,500,000 (94 per cent completed). New double-track drawbridge at Atlantic City, N. J., cost \$330,000 (completed). Renewal and reconstruction of bridges over system, cost \$968,000 (completed). \$968,000 (completed).

### Pittsburgh & Lake Erie

Third Track: Edenburg, Pa., to Pennsylvania-Ohio state line, 4 miles. Fourth Track: Edenburg, Pa., to Pennsylvania-Ohio state line, 4 miles. Important Work Undertaken: Reconstruction of viaduct at Homestead, Pa., cost \$212,000 (95 per cent completed). Grading for third and fourth main tracks, Fallston, Pa., to College, cost \$254,880 (25 per cent completed).

#### Portland Terminal Company

First Track: In Portland, Me., 0.40 miles.

Important Work Undertaken: New 40-stall enginehouse, boiler-washing plant, coal and ash handling facilities and westbound classification yard at South Portland, Me., cost \$1,750,000 (80 per cent completed).

## Port Utilities Commission of Charleston, S. C.

Important Work Undertaken: General cargo pier, 630 ft. long, 4171/2 ft. wide with four railroad tracks through center, cost \$550,000 (15 per cent completed).

### Richmond, Fredericksburg & Potomac

Important Work Undertaken: New locomotive terminal, machine shop, coaling station, etc., at Acca, Va., cost \$1,000,000 (95 per cent completed). New concrete and steel trestle at Neabsco, Va., cost \$120,000 (70 per cent completed).

## Roby & Northern

First Track: In Texas, 0.25 miles,
Second Track: In Texas, 0.33 miles.
Important Work Undertaken: Railroad completely rebuilt, including culverts, gradings, two bridges, new ties and rail fastenings, for electrical operation. A modern passenger station was built at Roby, Tex.; also a steel power house and substation and train-shed.

#### St. Louis-San Francisco

Second Track: Spring Hill, Kan., to Paola, 12.8 miles.

Important Work Undertaken: Grade reduction in vicinity of Crocker,
Mo., 1.57 miles, cost \$160,500 (completed). Change of line near Dixon, Mo.,
1.3 miles, cost \$175,000 (75 per cent completed). New engine terminal at
Lindenwood, St. Louis, Mo., cost \$900,000 (80 per cent completed).

#### St. Louis-Southwestern

Important Work Undertaken: Installation of fuel oil facilities along line, cost \$100,000 (75 per cent completed). New gravel plant on Ouachita river, Kent, Ark., cost \$195,000 (completed). Installation of fuel oil facilities for storage and handling at various points on the Texas lines, cost \$167,000 (completed).

## Salt Lake & Utah

Important Work Undertaken: New Passenger station at Salt Lake, Utah, cost \$225,000 (completed).

#### San Antonio & Aransas Pass

Important Work Undertaken: New bridge over Brazos river, near Wallis, Tex., cost \$263,000 (60 per cent completed).

### South Buffalo

First Track: In Buffalo, N. Y., 0.43 miles.

#### Southern Railway

Important Work Undertaken: Additions to existing shop buildings and construction of new boiler house, engine drop pit and additional machines at Alexandria, Va., cost \$105,000 (75 per cent completed).

#### Southern Pacific

First Track: West from Richgrove, Cal., 4.16 miles. Magunden, Cal., to Arvin, 16.89 miles. (Inter-California in Cal.) east and south from Calipatria, 21.72 miles. (Mexican lines) Tepic, Nayarit, Mex., to Costello,

Second Track: Wells, Nev., to Moor, 8.71 miles. Valley Pass, Nev., to Montello, 20.43 miles. Blue Canon, Cal., to Emigrant Gap, 5.32 miles. Indover, Cal., to Truckee, 6.48 miles. Cameron, Cal., to Mojave, 10.54 Montello, 20.43 miles,

Indover, Cal., to Truckee, 6.48 miles. Cameron, Cal., to Mojave, 10.54 miles.

Important Work Undertaken: Line revision to eliminate curves at Metz, Cal., cost \$210,000 (completed). Additional equipment and 80-ft. extension to machine shop at Los Angeles, Cal., cost \$610,000 (50 per cent completed). Replacing timber with concrete in tunnel at Hasson, Cal., cost \$135,000 (15 per cent completed). Industrial lead and team-yard at San Francisco, Cal., cost \$165,000 (60 per cent completed). Line change and construction of new yards and bridge at Yuma, Ariz., cost \$877,000 (50 per cent completed). Installation of rock crushing plant at Santa Margarita, Cal., cost \$252,000 (completed). Additional classification yard facilities at Los Angeles, cost \$475,000 (60 per cent completed).

Houston & Texas Central—An extension to the Dallas, Tex., belt line, now under survey, 8.83 miles.

Galveston, Harrisburg & San Antonio—Extension to present machine shop, 84 ft. by 258 ft., to serve as erecting shop at El Paso, Tex., cost \$231,243 (completed). Rearrangement and expansion of engine terminal at El Paso, cost \$243,016 (50 per cent completed). Reconstruction of bridge over Rio Grande river at Eagle Pass, Tex., cost \$252,912 (completed). Line revision at various points on system, cost \$179,107 (38 per cent completed). Change of grade cast of Alleyton, Tex., cost \$10,000 (90 per cent completed).

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Texas & New Orleans—Strengthening bridges on Dallas-Sabine branch, cost \$259,329 (85 per cent completed). Reconstruction of subway at Houston, Tex., cost \$305,694 (completed). Reconstruction of Neches river bridge at Beaumont, Tex., cost \$119,046 (work underway). Remodeling treating plant and installing power plant at Englewood, Tex., cost \$118,312 (91 per cent completed).

Morgan's Louisiana & Texas—Rearranging and expanding engine terminal of Lafavette. La., cost \$447,878 (35 per cent completed). Repairing and

MORGAN'S LOUISIANA & TEXAS—Rearranging and expanding engine terminal at Lafayette, La., cost \$447,878 (35 per cent completed). Repairing and straightening old levee at Algiers, La., cost \$196,099 (completed).

CENTRAL PACIFIC—Building new line north from Kirk, Ore., 30.56 miles. Installing electrically-driven rock crushing plants at Lucin, Utah, and Palisade, Nev., cost \$697,000 (completed). Line change to eliminate trestle at Mott, Cal., cost \$133,000 (60 per cent completed). Construction of saw and planing mill at Sacramento, Cal., cost \$212,000 (70 per cent completed). Oregon & California—Grade crossing elimination and relocation of highway at Oregon City, Ore., cost \$135,000 (40 per cent completed). Replacing timber trestle with steel at Jefferson, Ore., cost \$128,000 (completed).

MEXICAN LINES—Construction of an extension from Tepic, Mex., to La Quemada, involving 3,500,000 cu. yd. of excavation, also 33,000 cu. yd. of excavation from 33 tunnels with total length of 5 miles; also construction of 29 viaducts, total length of line 103 miles.

#### Tampa Southern

Important Work Undertaken: New line from Bradentown, Fla., to Sara-

#### Tennessee, Alabama & Georgia

Important Work Undertaken: New line under survey from Gadsden, Ala., Odenville, 36 miles

## Texas Southeastern

Important Work Undertaken: New line from Vair, Tex., to Hiltonia, 40

#### Toledo, St. Louis & Western

Important Work Undertaken: New main line change under survey, mile post 408 to mile post 409.3, 1.3 miles. New 27-stall enginehous etc., at Frankfort, Ind., cost \$300,000 (20 per cent completed).

#### Toledo Terminal

Second Track: In Toledo, Ohio, 2.5 miles.

#### Ulster & Delaware

Important Work Undertaken: Extension of locomotive erecting shops, etc., at Kingston, N. Y., cost \$105,000 (completed).

### Union Pacific

First Track: Homer Spur, Utah, to Park-Utah mine, 5.32 miles.

Second Track: Granger, Wyo., to Leroy, 43.01 miles. Emory, Utah, to Echo, 10.66 miles.

Important Work Undertaken: Additional Freight yards and other construction incidental thereto at Council Bluffs, Iowa, cost \$225,000 (completed). New one-story passenger station at Laramie, Wyo., cost \$160,000 (15 per cent completed). Construction of an open cut replacing twin tunnels, 169 ft. long near Edson, Wyo., cost \$125,000 (66 per cent completed). New 420-ton, conveyor type, coaling station at Carter, Wyo., cost \$111,000 (completed). Placing concrete lining in tunnel near Curvo, Utah, cost \$225,000 (45 per cent completed). New two-story and basement, brick freight office building, inbound freight house and construction of platforms. (completed). Placing concrete lining in tunnel near Curvo, Utan, cost \$225,000 (45 per cent completed). New two-story and basement, brick freight office building, inbound freight house and construction of platforms, etc., at Denver, Colo., cost \$600,000 (completed). New steel overhead viaduct and approaches, highway elimination at Denver, railroad company's proportion of cost, \$270,000 (completed). Additional right-of-way and construction of additional yard tracks at Denver, cost \$205,000 (completed).

#### Virginian

First Track: Milam, West Va., to Glen Morrison, 3.2 miles.

Important Work Undertaken: Double tracking and lining Kegley tunnel, cost \$176,384 (25 per cent completed). Electrifying line, Roanoke, Va.,

to Mullens, W. Va., cost \$7,662,670 (contracts let). Construction of coal pier No. 2, Sewalls Point, Va., cost \$3,300,000 (50 per cent completed).

#### Waco, Beaumont, Trinity & Sabine

Important Work Undertaken: New line under survey from Livingston, Tex., to West Port Arthur, 100.26 miles,

#### Western Maryland

Second Track: In the vicinity of Rockwood, Pa., 1.52 miles.

Important Work Undertaken: New store-room and office building at Hagerstown, Md., cost \$185,000 (75 per cent completed). New steel car repair yard, including paint shops, store houses, etc., at Port Covington, Baltimore, Md., cost \$115,000 (completed).

#### Western Pacific

Important Work Undertaken: New terminal yard and buildings at Stockton, Cal., cost \$800,000 (50 per cent completed). New freight terminal and north channel spur at Stockton, cost \$335,000 (completed). Extending yard facilities at various points on line, cost \$135,000 (completed). New steel viaduct, near Keddie, Cal., cost \$100,000 (completed). Renewal of bridge over San Joaquin river, cost \$200,000 (completed). New concrete warehouse at San Francisco, Cal., cost \$100,000 (completed). Extending machine and erecting shop and installation of additional cranes at Sacramento, Cal., cost \$100,000 (75 per cent completed). Completion of ice plant and attendant facilities at Carlin, Nev., cost \$100,000 (completed).

#### Wheeling & Lake Erie

Important Work Undertaken: Connection 2,300 ft. long, including two through girder spans at Massillon, Ohio, cost \$190,000 (25 per cent completed).

#### Wichita Valley

First Track: Byers, Tex., to Oklahoma state line, 5.85 miles. Oklahoma state line to Waurika, Okla., 7.43 miles.

## Woodward Iron Company

Important Work Undertaken: New line under survey from No. 3 Dolomite to No. 3 Air Slope, 2.5 miles.

## Railway Construction in Canada in 1923

#### Algoma Central & Hudson Bay

Important Work Undertaken: Revision of main line to eliminate trestles, mile post 103.80 to 104.79, cost \$187,000.

## Calgary & Fernie

Important Work Undertaken: New line surveyed and final location completed from Calgary, Alta., to Michel, B. C., 157 miles; grading contract for first 50 miles from Michel has been awarded.

#### Canadian National

First Track: Near Point Tupper, Nova Scotia, 0.51 miles. At Napanee, Ont., 0.78 miles. At Conmee, Ont., 3.05 miles. Near Nipissing Jct., Ont., 0.56 miles. Craik Jct., Sask., to Ardmore, 3.71 miles. Ansell, Alta., to Bickerdike, 3.9 miles. Battle, Alta., to Duhamel 3.48 miles. Milnes Landing, B. C., to Cowichan Lake, 42.8 miles. Long Lake, Ont., to Nakina, 29.5

Second Track: Mount, Ont., to Kakabika Falls, 15.98 miles. Near Milwaukee Jct., Mich., 0.11 miles.

Third Track: Mimico, Ont., to Port Credit, 3.74 miles.

#### Canadian Pacific

First Track: Lines east, 50 miles. Lines west, 337 miles. The following additional mileage was put into operation during the year: Consul, Sask., to Climax, 61 miles. Leader, Sask., to Burstall, 25 miles. Okanagan Falls, B. C., to Oliver on Penticton south branch of the Kettle Valley, 16.6 miles. North from Kapawa, Que., 69 miles. On Villemarie spur, 7.7 miles.

#### Central Canada

Important Work Undertaken: New line from Berwyn, Alta., 13 miles.

#### Edmonton, Dunvegan & British Columbia

Important Work Undertaken: New line from Grande Prairie, Alta., 15

#### Esquimalt & Nanaimo

Important Work Undertaken: Building from Stamp River, B. C., to Great Central Lake, 6.75 miles. Building double bascule, highway and railway bridge at Victoria, B. C., cost \$720,000 (completed).

#### Roberval-Saguenay

Important Work Undertaken: Extension of line from Ha Ha Bay Junction, Que., Can., to Peribonka River, 37 miles.

#### Temiskaming & Northern Ontario

Important Work Undertaken: New line from Island Falls Junction to near New Post, 25.6 miles. Building from Swastika, Ont., to Larder Lake (Nipissing Central Railway Company), 23 miles.



Through Service is Facilitated by Signals

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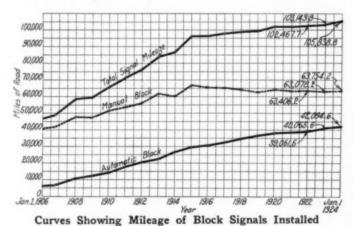
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# Signal Construction Shows Marked Increase

All Classes of Work Active—Remote Control Switch Installations Grow in Favor

By K. E. Kellenberger

A UTOMATIC train control has occupied the attention of the signal field during the past year, largely to the exclusion of other subjects. The feeling prevailed more or less generally at the beginning of the year that the order of the Interstate Commerce Commission requiring 49 railroads to make installations of train control would tend to slow up other signal construction activities, such as



the installation of automatic block signals and interlocking plants. While this order may have caused some roads to hold up other classes of signal construction work the year 1923 witnessed greater activity in automatic block signal and interlocking construction than 1922, in spite of the fact that a greater amount of work of this character was completed in 1922 than in any year since 1917. Consequently the amount of work completed during the year just closed indicates that signal construction activities are returning to normal after the big slump of 1920, irrespective of the train control order.

More interlocking plants were built and rebuilt and rearranged during the year just closed than in any year since 1917. A greater mileage of the manual block system was also put in service than in any year since 1919. A greater mileage of automatic block signals was completed than in any year since 1917, while the total block signal mileage placed in service exceeds that of any previous year since 1914. More automatic block signal and interlocking work was also under construction at the end of the year than at any time during the past five years, and the work reported as proposed for 1924 is much more than reported at any time during the same period.

A study of the statistics for 1923 shows that few extensive sections of automatic signals have been installed by any one road. Instead, sections of a few miles each have been put in service at different points on a system. in line with the signal construction tendencies of the last few years, as there has been little extension of railroad mileage and the developments now are intensive rather than extensive. As an outgrowth of this condition, short installations have been made to increase track capacity at congested points, to provide station and curve protection, shorten block sections and provide better facilities at approaches to yards. A number of roads still have in service considerable mileages of manual block signaling where traffic is fairly heavy and while it will only be a question of time before this is changed to automatic block, it is unlikely that large mileages will be changed over at one time since the tendency will be to make the change on short stretches where traffic conditions demand correction. This is what the railroads are doing at present. Automatic train control will continue to hold first place in the minds of many railroad officers during the present year, as the 49 train control installations are expected to be completed by January 1, 1925.

The interlocking plants installed in 1923 were comparatively small in size, as was the case last year, showing that

this class of construction is also undergoing intensive rather than extensive development. The character of the work being done is evidenced by the fact that a number of mechanical plants have been converted into electromechanical ones by the addition of electric levers, while considerable work was also done in replacing mechanical detector bars with electric detector locking, and approach and route locking and power distant signals were added at other plants.

Some of the outstanding developments in the interlocking field were the consolidation of interlocking plants to provide for more economical operation and greater centralization, the interlocking of both ends of passing sidings and the installation of many power-operated, remote control switch movements at the ends of passing sidings and double track and at bridges, as well as at the entrances and exits of yards. Interlocked desk circuit controllers are also being used to quite an extent to control power-operated functions, especially those located at a distance from the point of control. Another development of decided interest is the installation of automatic interlocking plants at crossings where the expense for levermen would hardly be warranted, but where a saving can be shown in the elimination of the few daily train stops which would otherwise be necessary. Some roads are making changes in their interlocking plants to provide for automatic A gradual development is also train control installations. evidenced in the signal lighting field, some roads substituting electric approach lighting for oil lights on their signals, while others are lighting their switch lamps electrically.

## Block Signaling Completed in 1923

A total of 2,695 miles of road in the United States and Canada was equipped with block signals (automatic and manual) during the past year, as compared with 1,533 miles These figures include new construction, reconstruction and replacement. Where changes were made in territory formerly equipped with automatic signals, these have represented the installation of additional signals on certain stretches to provide for running trains closer together in dense traffic territory. Light signals have replaced semaphore signals in other cases, while the signal systems have been reconstructed in other territories to provide for the addition of second, third or fourth main tracks. Developments were made at a number of points looking to the improvement of the track circuit, and a number of roads have changed from oil lighting to electric lighting of signals. The use of the trickle charge as a source of power by the various railroads has also increased.

Of the mileage completed in 1923, 676 represents manual blocking and 2,019 miles automatic, of which 82 miles is in Canada. No manual block mileage was reported from Canada. As some of the data refers to improvement to existing installations, the net increase in the mileage is less than the above figure. The total mileage of automatic signals reported as constructed or reconstructed in 1923 was 778 more than in 1922, while the total of 676 miles of manual blocking added in 1923 compared with 292 miles in 1922.

## Block Signaling Under Construction

The mileage of block signals under construction in the United States and Canada on December 31, 1923, was 1,085 while that under construction on the same date in 1922 was 477. The mileage under construction on December 31, 1923, was all in the United States except 49 miles in Canada. All of the work under way is automatic block signaling, some of which is replacing manual block signaling, while in other cases it consists of the replacement of one type of apparatus with another or new construction.

#### Work Proposed for 1924

The block signaling work proposed for the ensuing year is entirely automatic. The total length of road that it is expected will be equipped is 1,163 miles or 336 miles more than was contemplated at this time a year ago.

Of the automatic block signaling proposed for the present year, 110 miles is in Canada. As the plans of many of the roads are still indefinite and many budgets have not been approved, it is reasonable to expect that considerable additional work will be authorized unless conditions detrimental to the railroads arise.

The figures so far available, together with the data covering the work now under construction and planned for 1924, are shown in the accompanying tables under six heads as fol-

- -Automatic Block Signaling Completed in 1923.
- -Automatic Block Signaling Under Construction.
- -Automatic Block Signaling Proposed for 1924.
- D—Interlocking Completed in 1923. E—Interlocking Under Construction.
- F-Interlocking Proposed for 1924.

Total ...... 1,294.3

TABLE A-New Automatic Block Signals Completed in 1923

	track miles	track	track	track miles	Total miles road
United States	1,172.3 56.2	746.8 25.8	11.5 0.0	6.6	1,937.2 82.0
Total	1,228.5	772.6	11.5	6.6	2,019.2
TABLE B-NEW	AUTOMATIC	Brock	SIGNALS HAPPE	Conces	

ATIC BLOCK SIGNALS UNDER CONSTRUCTION

	DECI	EMBER 31	, 1923		
United States. Canada		481.6 47.8	13.		1,036.2 48.8
Total	539.3	529.4	13.	.0 3.3	1,085.0
TABLE C	-New Automatic	C BLOCK	SIGNALS	PROPOSED FOR	1924
United States. Canada	1,184.3	352.9 0.0		0.0	1,552.7 110.0

352.9 TABLE D-INTERLOCKING PLANTS-COMPLETED IN 1923

15.5

1,662.7

			Number f Plants	Numl	per of l	Levers		Number
United Canada	States	New 97 11	Rebuilt of additions	Mechanical 960 129	Elec. 774 31	Electro- pneumatic 137 00	Total levers 1,871 160	remote control switches 45 00
Total		108	58	1,089	805	137	2,031	45
	TABLE	E-1	Under Co	NSTRUCTION	, DEC	EMBER 31, 1	1923	
United Canada	States	42 4	20 2	333 47	709 00	334 00	1,376 47	46 00
Total		46	22	380	709	334	1,423	46
			TABLE F-	-Proposed	FOR 1	924		
United Canada	States	57 2	41	392 54	486 00	208 00	1,086 54	16 00
Total		59	44	446	486	208	1,140	16
	d States	196 17	116 8	1,685 230	1,969 31	679 00	4,333 261	107 00
Grand T	Total	213	124	1,915	2,000	679	4,594	107

Manual block completed, 668, single track; 8, double track; total, 676 miles.

TOTAL CONSTRUCTION 15 YEARS-I. C. C. REPORTS

		MILLES OF MO	18.20	** . *** .
Year		Construction automatic block	Net addition to manual block	Net addition to miles of road operated by block system
1908		1,387.6	*517.6	870.0
1909		2.047.1	4.162.2	6,209.3
1910	***************	3,473.8	2.037.3	5,511.1
1911			2,517.2	5,140.6
1912	**************		5,656,2	7,540.1
1913	**************		*1,563.4	2.787.1
1914		3,294.2	6,577.5	9.871.7
1915	****************	1.079.0	*1.112.0	*33.0
1916	***************		*179.8	1.832.3
1917	****************		*1,114.7	1,123.8
1918		1,796.3	*1.430.3	366.0
1919		979.4	1.007.1	1,986.5
1920		575.1	*575.7	*0.6
1921		517.6	66.5	584.1
1922	**************	1,004.1	*328.0	676.1

<sup>\*</sup>Decrease.

TABLE A-AUTOMATIC BLOCK SIGNALS INSTALLED IN 1923

Number of Signals Semaphore Oil Light Primary D. C. Miles or Electric Lights Storage Battery Position Light Color Light of Road Upper Ouad Lower Quad A. C. Maker To From Road ... U. S. & S. d. c. prim. elec. A. C. L.....Bennets, S. C......Drayton ..... 5 ... elec. U. S. & S. d. c. prim. 26 ... . . . ... U. S. & S. prim. elec. 12 d. c. ... . . . ... Doctortown, Ga. Jesup

A. T. & S. F. Caney, Kan. Owen, Okla.
Raton, N. M. Dillon, N. M.
Gise, N. M. Fox, N. M.
Lamy, N. M. Domingo
Mission, Kan. Burrton
Gainesville, Tex. Thackersville
Yampai, Ariz. Griffith
Griffith, Ariz. Topock
Bagdad, Cal. Daggett

Can. Nat. Yarmouth, Me Portland
Dixie, Que. Pointe Claire
Napanee, Ont.
Port Union, Ont
Coburg, Ont. Brantford
Bayview, Ont. Hamilton
St. Hubert, Que. St. Lambert
Battle, Alta. Bashaw, G. P. T. Jet.
Ryley, Alta.
Entwistle, Alta.
Entwistle, Alta.
Regina, Sask.

C. & W. I. Chicago, 22nd St. 38th St.
C. of Ga. Fort Valley, Ga. Albany U. S. & S. d. c. prim. elec. 10 ... ... ... prim. prim. prim. prim. stor. prim. d. c. d. c. d. c. d. c. d. c. a. c. a. c. a. c. elec. 11 elec. elec. elec. 25 55 25 25 22 elec. elec. elec. 89 50 74 elec. 11.3 s 5.4 d 3.0 d 2.8 d 1.0 d 7.5 d 1.2 d 2.2 d 10.0 s 2.0 s 5.0 s 4.0 s 17 stor. stor. stor. stor. stor. stor. stor. prim. prim. d. c. • • • • 2 5 G. R. S. oil 70% oil 30% elec. 1.9 d .... both C. of Ga......Fort Valley, Ga.....Albany ..... 77.5 s 138 U. S. & S. d. c. ... ... ... . . . . . C. of Ga. Fort Valley, Ga.

C. Pac. Tichborne, Ont.

MacGregor, Man. M. P. 76.3-M. P. 79.

Petain, B. C. M. P. 41.3-M. P. 43.2

Leanchoil, B. C. Golden 1.9 s 2.7 d 1.0 s 21.0 s G. I Fed. Fed. Fed. R. S. d. c. d. c. d. c. d. c. Prim. Prim. Prim. Prim. 4 2 ... ... ... elec. ... elec. Leanchoil, B. C... Golden
C. of N. J... Nesquehoning Jct., Pa.
C. B. & Q... Macon, Mo... Cameron Jct. 1
East Winona, Wis. Purdy
Alma, Wis. Stockholm
Diamond Bluff, Wis. Hastings
Guernsey, Wyo. Wendover
McCook, Neb. Culbertson
Casper, Wyo. Brookhurst
C. & E. I.. Springhill, Ind. Emison
Alice, Ind. Hazelton
C. & N. W. West Chicago, Ill. Ferris 1.4 d 101.2 s . 12.4 s 21.4 s 14.0 s 8.6 s 12.2 s 4.6 s Prim. stor. prim. prim. prim. stor. stor. prim. 4 elec. elec. elec. elec. elec. elec. elec. . . . . . . . . . . . . . . . . . d. c. 233 29 50 37 • • • 13 2 4.6 s 41.0 s 12.0 s {6.3 s} 4.7 d} 3.0 s 1.6 d 25.0 d U. S. & S. U. S. & S. d. c. stor. elec. . . . stor. clec. G. R. S. 19 d. c. stor. elec. ... ... Hall U. S. & S. U. S. & S. d. c. a. c. d. c. 2 prim. • • • elec. · · · 6 ... elec. prim. 50 U. S. & S. U. S. & S. a. c. d. c. . . . 12 . . . elec. . . . . . . prim. Oil 339 G. R. S. d. c stor. elec. . . . . . . G. R. S. d. c d. c d. c d. c d. c prim. prim. stor. stor. prim. ... elec. • • • • . . . 308 ...8 elec. I. R. T. New York, N. Y.
I. C. South Chicago, Ill. 67th St. to 83d St...
Richton, Ill. Peotone

Kankakee, Ill. Otto
Moroa, Ill. Hervey City 2.8 d 5.3 t 4.6 f 4.7 t 21.1 s 1.8 d 16.2 s 105.3 s 2.55 d U S. & S. 2 13 31 27 42 63 ... stor. stor. stor. stor. stor. d. c. prim. 28 10 2.55 d 0.3 s .15 d {0.2 s} {7.3 d} 11.3 s ... ... ... \*\*\*\*\*\*\*\*\* . . . . . . . . . . . . . . . . . . West Junction, Miss....Lake Cormorant ..... 7 9 . . . . . . . . . . elec. ... ... . . . . . Coahoma, Miss. ...... Clarksdale ..... Hall 14 elec. ... . . . 24 L. V. Newark, N. J. Cranford
Bethlehem, Pa. Allentown
Hazleton Shaft, Pa. Oneida Jet.
Gracedale, Pa. Mt. Top
L. I. Jamaica, N. Y. Springfield 6.1 d 0.8 d 1.9 d 1.1 d ... a. c. a. c. a. c. a. c. elec. elec. elec. elec. stor. stor. stor. stor. 3.9 d a. c. elec. . . . ... L. I. Jamaica, N. Y. Springfield

Monongahela Van Zandt, Pa.. Morgantown, W. Va.

M. K. T. Dallas Jct., Tex. New terminal
Red River, Tex.. New terminal
New Terminal, Tex. Pottsboro
Pottsboro, Tex. Whitesboro
Ray Terminal, Tex.
Machens, Mo.

M. P. Ramapo, Kan. Nearman
Leeds, Mo. Martin City . . . . . a. c. d. c. d. c. d. c. d. c. 4 5 8 30 10.0 s 22 U. S. & S. stor. elec. 1.5 s 3.5 s 7.0 s 16.0 s .4 s 1.0 s prim. prim. prim. prim. prim. prim. ... ... ... SSSSSS elec. elec. elec. elec. elec. elec. a. c. d. c. · · i ... 4.0 s 15.0 s d. c. d. c. G. R. S. G. R. S. stor. Me. Central...

P. T. Portland, Me. Tower, 4. Tower 5
Portland, Me. Tower, 2. Tower 3
N. & W. Blue Stone, W. Va. Ruth
N. Y. C. Hoffmans, N. Y. Fonda
W. Haverstraw, N. Y. West Nyack
N. Y. N. H. & H. Boston Switch, Mass. East Junction
Auburn, R. I. Providence
Mt. Bowdoin, Mass. Morton Street
Dilworth, Minn. Buffalo
Buffalo, Minn. Bloom, N. D.
Bloom, N. D. Jamestown, N. D.
Cheney, Wash. Pasco 6 2 1.3 d U. S. & S. U. S. & S. prim. prim. . . . d. c. 1.9 s U. S. & S. ... . . . a. c. prim. elec. d. c. d. c. oil. ... ... ... stor. 3.6 d 3.9 d 2.0 d 44.0 d 51.5 s 4.0 d 129.0 s elec. elec. elec. elec. elec. a. c. a. c. d. c. d. c. d. c. G. R. S. 4 7 65 103 stor. prim. prim. G. R. S. G. R. S. G. R. S. 237 G. R. S. prim. d. c. elec

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36.2 18.8

35.0 32.7 0.0 52.7

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45

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Road   From   To   To   Color   Colo	
Road   From   To   Road   Quad   Quad   Quad   Light   Light   Maker   A. C.   Battery	Oil
A. V. Block, Pa. Aron	Electric Lights
MY	cil
Becks Run   30th Street   1.0 d   4	elec.
East Liberty, Pa. Wilkinsburg   2.0 f   30	elec.
SZ Interlocking, Pa. Trafford   5 d   8   2.0 a. c. prim.	elec.
Earlville, O. Alliance 23.0 d 49 U. S. & S. d. c. stor. Crestline, O. Adams, Ind. 126.0 d	elec.
Crestline, O. Adams, Ind. 126.9 d Broadway Ft. Wayne, Ind. 5 Eric Crossing, O. Mansfield, O	elec.
Broadway   Ft. Wayne, Ind.	elec.
Erie Crossing, O. Mansfield, O. S. P. Grants Pass, Ore. Woodburn 51.5 s 77 U.S. & S. d. c. prim. Wels, Nev. Moor 8.7 d 10 U.S. & S. d. c. prim. Valley Pass, Nev. Montello 20.4 d 26 U.S. & S. d. c. prim. Wheatland, Cal. Hornbrook 13.9 s 14 U.S. & S. d. c. prim. Wheatland, Cal. 4.2 s 2 U.S. & S. d. c. prim. U.S. & S. d. c. prim. Wheatland, Cal. 3.4 s 2 U.S. & S. d. c. prim. Blue Cance, Cal. "migrant Gap 5.3 d U.S. & S. d. c. prim. Andover, Cal. Truckee, Nev. 6.5 d 20 U.S. & S. d. c. prim. Andover, Cal. Mojave 10.5 d 17 U.S. & S. d. c. stor. Bakersfield, Cal. Mojave 10.5 d 17 U.S. & S. d. c. prim. Famoso, Cal. Mojave 10.5 d 17 U.S. & S. d. c. prim. Gidden Yd., Cal. 0.9 s 3 U.S. & S. d. c. prim. Gidden Yd., Cal. 0.9 s 3 U.S. & S. d. c. prim. Gidden Yd., Cal. 0.9 s 3 U.S. & S. d. c. prim. U.S. & S. d. c. prim. Gidden Yd., Cal. 0.9 s 3 U.S. & S. d. c. stor. Hacienda, Cal. 3.9 s 6 U.S. & S. d. c. stor. Del Rio Yd. Cal. 0.4 s 3.9 s 6 U.S. & S. d. c. stor. Del Rio Yd. Cal. 0.4 s 5 d 2 U.S. & S. d. c. stor. Del Rio Yd. Cal. 0.4 s 5 d 2 U.S. & S. d. c. stor. Del Rio Yd. Cal. 0.4 s 5 d 2 U.S. & S. d. c. stor. Del Rio Yd. Cal. 0.4 s 5 d 2 U.S. & S. d. c. stor. Del Rio Yd. Cal. 0.4 s 5 d 2 U.S. & S. d. c. stor. Del Rio Yd. Cal. 0.4 s 5 d 3 U.S. & S. d. c. stor.	elec.
S. P. Grants Pass, Ore. Wordburn 51.5 s 77 U. S. & S. d. c. prim. Wels, Nev. Moor 8.7 d 10 U. S. & S. d. c. prim. Valley Pass, Nev. Montello 20.4 d 26 U. S. & S. d. c. prim. Snowden, Cal. Hornbrook 13.9 s 14 U. S. & S. d. c. prim. Wheatland, Cal. 4.2 s 2 U. S. & S. d. c. prim. Lincoln, Cal. 3.4 s 2 U. S. & S. d. c. prim. Blue Cancen, Cal. "migrant Gap 5.3 d 14 U. S. & S. d. c. prim. Andover, Cal. Truckee, Nev. 6.5 d 20 U. S. & S. d. c. prim. Andover, Cal. Truckee, Nev. 6.5 d 20 U. S. & S. d. c. prim. Primoso, Cal. Mojave 10.5 d 17 U. S. & S. d. c. prim. Niland, Cal. 0.9 s 3 U. S. & S. d. c. prim. Glidden Yd., Cal. 0.45 s 4 U. S. & S. d. c. prim. Glidden Yd., Cal. 3.9 s 6 U. S. & S. d. c. stor. Hacienda, Cal. 3.9 s 6 U. S. & S. d. c. stor. Del Rio Yd. Cal. 0.4 s 3 3 U. S. & S. d. c. stor.	elec.
Wels, Nev.         Moor         8.7 d         10         U. S. & S. d. c. prim.           Valley Pass, Nev.         Montello         20.4 d         26         U. S. & S. d. c. prim.           Snowden, Cal.         Hornbrook         13.9 s         14         U. S. & S. d. c. prim.           Wheatland, Cal.         4.2 s         2         U. S. & S. d. c. prim.           Lincoln, Cal.         3.4 s         2         U. S. & S. d. c. prim.           Blue Canen, Cal.         "Smigrant Gap         5.3 d         14         U. S. & S. d. c. prim.           Andover, Cal.         Truckee, Nev.         6.5 d         20         U. S. & S. d. c. stor.           Bakersfield, Cal.         Mojave         10.5 d         17         U. S. & S. d. c. prim.           Famoso, Cal.         1.4 s         4         U. S. & S. d. c. prim.           Niland, Cal.         0.9 s         3         U. S. & S. d. c. prim.           Glidden Yd., Cal.         0.45 s         4         U. S. & S. d. c. stor.           Hacienda, Cal.         0.4 s         3         U. S. & S. d. c. stor.	elec.
Valley Pass, Nev. Montello 20.4 d 26 U. S. & S. d. c. prim. Snowden, Cal. Hornbrook 13.9 s 14 U. S. & S. d. c. prim. Wheatland, Cal. 4.2 s 2 U. S. & S. d. c. prim. Lincoln, Cal. 3.4 s 2 U. S. & S. d. c. prim. Blue Cancan, Cal. "migrant Gap 5.3 d 14 U. S. & S. d. c. prim. Andover, Cal. Truckee, Nev. 6.5 d 20 U. S. & S. d. c. prim. Andover, Cal. Mojave 10.5 d 17 U. S. & S. d. c. prim. Primeso, Cal. 14 s 4 U. S. & S. d. c. prim. Niland, Cal. 0.9 s 3 U. S. & S. d. c. prim. Glidden Yd., Cal. 0.45 s 4 U. S. & S. d. c. prim. Glidden Yd., Cal. 3.9 s 6 U. S. & S. d. c. stor. Hacienda, Cal. 3.9 s 6 U. S. & S. d. c. stor. Del Rio Yd. Cal. 0.4 s 3 3 U. S. & S. d. c. stor.	elec.
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Lincoln, Cal. 3.4 s 2 U. S. & S. d. c. prim. Blue Canen, Cal. Emigrant Gap 5.3 d 14 U. S. & S. d. c. prim. Andover, Cal. Truckee, Nev. 6.5 d 20 U. S. & S. d. c. stor. Bakersfield, Cal. Mojave 10.5 d 17 U. S. & S. d. c. prim. Famoso, Cal. 1.4 s 4 U. S. & S. d. c. prim. Niland, Cal. 0.9 s 3 U. S. & S. d. c. prim. Glidden Yd., Cal. 0.45 s 4 U. S. & S. d. c. stor. Hacienda, Cal. 3.9 s 6 U. S. & S. d. c. stor. Del Rio Yd. Cal. 0.4 s 3 U. S. & S. d. c. stor. Del Rio Yd. Cal. 0.4 s 3 U. S. & S. d. c. stor.	elec. Oil
Blue Canon, Cal.   Smigrant Gap   5.3 d     14   U. S. & S.   d. c.   prim.	Oil
Andover, Cal. Truckee, Nev. 6.5 d 20 U. S. & S. d. c. stor. Bakersfield, Cal. Mojave 10.5 d 17 U. S. & S. d. c. prim. Famoso, Cal. 1.4 s 4 U. S. & S. d. c. prim. Niland, Cal. 0.9 s 3 U. S. & S. d. c. prim. Glidden Yd., Cal. 0.45 s 4 U. S. & S. d. c. prim. Hacienda, Cal. 3.9 s 6 U. S. & S. d. c. stor. Del Rio Yd. Cal. 0.4 s 3 U. S. & S. d. c. stor. Del Rio Yd. Cal. 0.4 s 3 U. S. & S. d. c. stor.	elec.
Bakersfield, Cal.       Mojave       10.5 d       17       U. S. & S. d. c. prim.         Famoso, Cal.       1.4 s       4       U. S. & S. d. c. prim.         Niland, Cal.       0.9 s       3       U. S. & S. d. c. prim.         Glidden Yd., Cal.       0.45 s       4       U. S. & S. d. c. stor.         Hacienda, Cal.       3.9 s       6       U. S. & S. d. c. stor.         Del Rio Yd. Cal.       0.4 s       3       U. S. & S. d. c. stor.	elec.
Fameso, Cal.     1.4 s     4     U. S. & S. d. c. prim.       Niland, Cal.     0.9 s     3     U. S. & S. d. c. prim.       Glidden Yd., Cal.     0.45 s     4     U. S. & S. d. c. stor.       Hacienda, Cal.     3.9 s     6     U. S. & S. d. c. stor.       Del Rio Yd.     Cal.     0.4 s     3     3     U. S. & S. d. c. stor.	elec.
Niland, Cal.       0.9 s       3       U. S. & S. d. c. prim.         Glidden Yd., Cal.       0.45 s       4       U. S. & S. d. c. stor.         Hacienda, Cal.       3.9 s       6       U. S. & S. d. c. stor.         Del Rio Yd. Cal.       0.4 s       3.9 s       3       U. S. & S. d. c. stor.	oil
Glidden Yd., Cal. 0.45 s . 4 . U. S. & S. d. c. stor. Hacienda, Cal. 3.9 s . 6 . U. S. & S. d. c. stor. Del Rio Yd. Cal. 0.4 s . 3 U. S. & S. d. c. stor.	oil
Hacienda, Cal	oil
Del Rio Vd. Cal 0.4 s 3 II S & S d.c. ster.	elec.
St I & S F Breedale Kan.	oil
	Oil
St. L. & S. F	Oil
	Oil
	Oil
	elec.
	elec.
	elec.
	elec.
	elec. Oil
W. P	Ou
1,228.5 s 1,225 510 1,567 172 772.64 d 11.5 t 6.6 f	

Note: s = single track, d = double track, t = three track, f = four track.

Thirty-six roads report having completed automatic block signal work during 1923. The Great Northern installed the largest mileage of automatic signals of any one road, putting them in service on 385 miles of roads of which 297.1 miles was single track and 87.9 miles double track.

Of the 24 roads reporting automatic block signal work under construction at the end of the year, the greatest amount was 177 miles of single track on the Louisville & Nashville. Of the 26 roads reporting work proposed for 1924, the Great Northern contemplates the construction of 202 miles of single track signaling while the Louisville & Nashville expects to construct 141 miles of single track and 34 miles of double track signaling or a total of 175 miles of road. The Santa Fe expects to install 143 miles of signaling, 57.2 of which is single track and 85.8 double track which will require the use of 177 upper quadrant semaphore signals. In Canada, the Canadian Pacific contemplates the installation of 110 miles of single track automatic block which will require the use of 195 upper quadrant semaphore signals.

## Manual Block Signaling

The manual block signaling installed during 1923 aggregated 676 miles, of which 668 was single track and 8 miles double track. The only road that installed any manual block was the Pennsylvania. The largest mileage was installed in the Southwestern region, the total being 268.9 miles of single and 6.6 miles of double track. The Northwestern region placed in service 380 miles of single track manual signaling and the Central region completed 19 miles of single and 1.5 miles of double track manual block. No installations of manual block were reported under construction or contemplated for 1924.

## Interlocking Construction in 1923

The number of interlocking plants built or rebuilt in 1923 was much greater than in 1922. During the year just closed the roads of the United States reported 152 plants and those of Canada 14, as compared to 95 and 10 in 1922. The number of plants under construction in the United States on December 31, 1923, was 62, and in Canada, 6, as compared to

46 and 3 in 1922. A total of 98 plants are proposed in the United States and 5 in Canada for this year in comparison with 34 proposed in the United States and 8 in Canada a

Thirty-five roads built new interlocking plants or made changes in existing ones during the year just closed, affecting a total of 166 plants, 14 of which are in Canada. Of the 152 plants in the United States, it appears that 55 were rebuilt or rearranged and that 3 of the 14 plants in Canada had also been in service. This leaves a total of 97 new plants completed in the United States and 11 in Canada. The total number of mechanical levers reported installed was 960 in the United States and 129 in Canada. The number of power levers installed in the United States was 911 and Canada reported 31, making a total of 942 in all.

## Interlocking Construction Data

Table D gives the list of interlockings completed last year. This must of necessity be considered more of an exhibit of the work done than as showing the precise amount of the increase in interlocking apparatus, as some of the figures represent reconstruction and enlargements. Some duplications also occur of necessity, as one plant may be reported by two or more roads. The same remarks apply also to tables E and F.

Twenty-six roads had interlockings under construction at the end of the year. In the United States, 62 plants are under way, 20 of which are being rebuilt or enlarged. In Canada, 6 plants are under construction, 4 of which are new. The total number of mechanical levers reported under construction was 333 in the United States and 47 in Canada. The number of power levers under construction in the United States was 1,043 and none in Canada, making a total of 1,423 levers in all.

Twenty-six roads propose to make interlocking installations during 1924. Of the 98 plants contemplated in the United States it appears that 41 are to be rebuilt or enlarged, leaving a total of 57 new plants in prospect. Reports from Canada indicate that 2 new plants will be installed and 3 plants will be rebuilt, a total of 5 in all. The total number of mechanical levers proposed is 392 in the

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## TABLE B-AUTOMATIC BLOCK SIGNALS UNDER CONSTRUCTION ON JANUARY 1, 1924

			Number	of Sign	als				0.11	
	Miles	Sema	phore	1	Light	Maker	D. C.	Primary	Oil or electric	
Road From To	of Road	Upper Quad.	Lower Quad.	Color Light	Position Light		A. C.	storage battery	lights	
A. C. LYamassee, S. CHardeeville	30.8 d	58	200001		D.But	II. S. & S.	d. c.	prim.	elec.	
A. T. & S. FOtero, N. MHebron	6.6 s	7				U. S. & S. U. S. & S.	d, c,	prim.	elec.	
Dalies, N. MRio Puerco	8.7 d			13		U. S. & S.	a. c.		elec.	
Perea, N. MGallup	15.8 d		* * *	20	***	U. S. & S.	a. c.		elec.	
Gallup, N. M Defiance	8.0 d			11	* * *	U. S. & S.	a. c.	*****	elec.	
Kern Junction, CalifBakersfield	2.5 d	* * *	* * *	7	* * *	******	d. c.	stor.	elec.	
C. & OMcConnell, W. VaMan	10.6 s 2.4 d			34		U. S. & S.	d. c.	stor.	elec.	
C. P Melfort, Sask	1.0 s	3		34		Fed.	d. c.	prim.	oil	
C. NToronto, OntBayview	34.8 d	***		62		U. S. & S.	d. c.	stor.	elec.	
Westport, OntTwin City	13.0 d			13		U. S. & S.	a. c.		elec.	
C R I & P Latimer, Kan, Herrington	8.0 d	16		***	* * *	U. S. & S.	d. c.	prim.	elec.	
C. & N. WMelrose Park, IllElmhurst	4.0 d	* * *		6			d. c.	stor.	elec.	
Elmhurst, Ill West Chicago	13.0 t	* * *		52	* * *		d. c.	stor.	elec.	
Kickapoo, IllRadnor	2.0 s 7.0 d	* * *	* * *	15			d. c.	stor.	elec.	
C & W T Chinama Foot Ca Clas Ca	3.1 d		* * *	* * *	* * *	*******	d. c.	stor.	elec.	
C. & W. I Chicago, 58th St81st St	1.5 s	***	* * *	· · i		Hall	a. c.	201.		
I. COtto, Ill	19.2 d			162				stor.	elec.	
	(1.5 s)								elec.	
Lawrence, TennBemis	2.0 d j			17				stor.		
L. I	3.3 f	27			***	U. S. & S.	a. c.		elec.	
L. & NMontgomery, AlaMobile	177.0 s	***	* * *	* * *		U. S. & S.	d. c.		elec.	
MKK	4.5 s 4.0 d	20		* * *	***	U. S. & S.	d. c.	prim.	elec.	
Temple, TexYards	1.5 s	4	* * *	* * *		U. S. & S.	d. c.	prim.	elec.	
Granger, TexYards	3.0 s	2	***	8		U. S. & S.	d. c.	prim.	elec.	
N. & WShenandoah, Va Hagerstown, Md	106.0 s				202	U. S. & S. U. S. & S.		*****	elec.	
N V C Rotterdam Ict N V Harbor	66.7 d			133		Hall	d. c.	stor.	elec.	
Amboy, N. Y. Lyons Dumont, N. J. West Nyack Valhalla, N. Y. Pleasantville Buffalo, N. Y. Buffalo Creek	38.6 d			83		Hall	d. c.	stor.	elec.	
Dumont, N. JWest Nyack	10.4 d			14		Hall	d. c.	stor.	elec.	
Valhalla, N. YPleasantville	6.1 d			14		Hall	d. c.	stor.	elec.	
Buffalo, N. YBuffalo Creek	0.6 d	***		36		Hall	d. c.	stor.	elec.	
Beacon, N. YChelsea	4.2 d	13	* * *	20	* * *	Hall G. R. S.	d. c.	stor.	oil elec.	
Madison, OPainesville	10.0 d 9.0 d		* * *	40		G. R. S.	d. c.	stor.	elec.	
C. C. C. & St. L. Pana, Il	70.0 d	121	* * *		* * *	Hall	d. c.	stor.	elec.	
M. CJacksen, MichRives Jet.	10.0 d	24		***		U. S. & S.	d. c.	stor.	elec.	
Toledo, O Detroit, Mich	56.0 d		***	87			a. c.		elec.	
				4						
P. M Detroit, Mich Plymouth	17.0 d			26		U. S. & S. U. S. & S. U. S. & S.	d. c.	stor.	elec.	
S. PAlpine, TexToronto	13.0 s		18			U. S. & S.	d. c.	stor.	elec.	
Piasano, Tex	5.9 s		6	* * *	* * *	U. S. & S.	d. c.	stor.	elec.	
Marfa, Tex	5.1 s 5.5 s		6	* * *		U. S. & S. U. S. & S. U. S. & S.	d. c.	stor.	elec.	
Noonan, Tex	5.6 s	* * *	6	* * *		U. S. & S.	d. c.	stor.	elec.	
Uvalde, Tex.	5.5 s		6	***	***	U. S. & S.	d. c.	stor.	elec.	
Bayou Sale, LaCade	37.2 d	***	52	***		II. S. & S.	d. c.	stor.	elec.	
Englewood, Tex Eureka	7.9 d		24	***		U. S. & S.	d. c.	stor.	elec.	
Nacogdoches, Tex Bonita Jct	0.5 d		4			U. S. & S.	d. c.	prim.	elec.	
St. L. & S. F Monett, Mo Afton, Okla	61.0 s	123	* * *	***	* * *	U. S. & S.	d. c.	prim.	elec.	
	5.0 d	4 - 4		* * *	* * *	TT C 0 C			-21	
Joplin, Mo	0.3 s	2	* * *	* * *	* * *	U. S. & S.	d. c.	prim.	oil	
U. P. Hammet Ida Challe	4.7 d		22			U. S. & S.	d. c.	stor.	elec.	
O. S. L	3.3 s			6	***	G. R. S.	a. c.	*****	elec.	
WabashBirmingham, MoHarlem	8.0 s	6	***		***	U. S. & S.	d. c.	prim.	elec.	
Moberly, Mo	1.2 s	1	***		***	U. S. & S. U. S. & S.	d. c.	prim.	oil	
Excelsior Springs Jct.,	0.9 s	2				U. S. & S.	d. c.	prim.	oil	
Mo		Married Wilson, Street,	-	-	-					
	539.3 s 529.4 d 13.0 t	437	150	897	202					

NOTE: s—single track; d—double track; t—three track; f—four track.

## TABLE C-AUTOMATIC BLOCK SIGNALS CONTEMPLATED FOR 1924

			Number	of Sign	als				
	Miles	Sema	phore	1	Light		D. C.	Primary	Oil
Road From To	of Road	Upper Quad.	Lower Quad.	Color	Position Light	Maker	A. C.	storage battery	electric lights
A. C. LParkton, N. CPee Dee, S. C	56.1 d	105		***	***	U. S. & S.	d. c.	prim.	elec.
Uceta, FlaTampa, Fla	.7 s	6	* * *	***		U. S. & S.	d. c.	prim.	elec.
	3.5 d					U. S. & S.	1 .		-1
A. T. & S. FHu-Tower, KanMelvern	19.6 d	40		* * *	***		d. c.	prim.	elec.
Ridgetown, Kan Neosho Rapids	14.0 d	35	* * *	* * *			d. c.	prim.	elec.
Domingo, N. M Hahn	33.5 s	53			* * *	U. S. & S. U. S. & S.	d. c.	prim.	elec.
Melvern, KanRidgetown	8.1 d	32	***		* * *	U. S. & S.	d. c.	prim.	elec.
Hebron, N. MFrench	19.7 s 2.0 s		* * *			U. S. & S.	d. c.	prim.	elec.
Ft. Worth, TexNo. Ft. Worth	2.0 s	6			* * *	U. S. & S.		prim.	elec.
O. C. Xing, OklaPurcell	44.1 d		* * *			U. S. & S.	d. c.	prim.	elec.
	70.0 s	124		* * *		C. S. & S.	a. c.	prim.	elec.
C. P		32		* * *			d. c.	prim.	elec.
Glacier, B. CAlbert Canyon	22.0 s	39		* * *			d. c.	prim.	elec.
C. RR. of N. JLakehurst, N. JWinslow Jct.	38.0 s		* * *		76	U. S. & S.	d. c.	brane.	elec.
C. & O Cliffside, Ky Russell	7.3 d		***	* * *		C. D. W 131			cicc.
0 0 111	75.0 s	4		90			d. c.		
C. & N. WChase, WisW. Allis	5.0 d		* * *	11				stor.	elec.
Erie		0.00		19		U. S. & S.	d. c.	stor.	elec.
G. NWolf Point, MontHavre	2020 -					C. D. G O.	d. c.	stor.	elec.
I. R. T	20210 0			51			a. c.	*****	elec.
L. & NLouisville, KyMontford, Tenn							401 (40		01001
Lo. W. IV LANGE VIEW, ILY.	34.0 d								
M. K. TPaola, KanMoran	51.0 s	80				U. S. & S.	d. c.	prim.	elec.
Me. Kittrick, Mo	5.0 s	6				U. S. & S.	d. c.		d. c.
Gainesville, Tex	2.0 s			2		U. S. & S.	d. c.	prim.	elec.
N. Y. O. & W	20.0 s					U. S. & S.		prim.	elec.
N. Y. C. & St. L Bellevue, O Edgerton, Ind	68.0 s								
and the first continuentary of the configuration of	38.0 d			***					
N. & W Neal, W. Va Prichard	11.0 s					U. S. & S.	d. c.	prim.	elec.
	26.0 d		200						

			Number	of Signa	ls				
	Miles	Sema	aphore	L	ight	_	D. C.	Primary	Oil
Road From To	Road	Upper Quad.	Lower Quad.	Color Light	Positi Ligh	on it Maker	A. C.	Storage Battery	Electric Lights
N. & W Naugatuck, W. Va Tunnel No. 1		***	* * *			U. S. & S.	d. c.	prim.	elec.
	6.0 d	***		* * *		0 0 0			alas
N. PLittle Falls, MinnPhilbrook	. 28.0 s	50				G. R. S.	d. c.	prim.	elec.
Philbrook, Minn Staples	6.0 d	7	0.00	0.0.0	0 0 0	G. R. S.	d. c.	prim.	elec.
N. Y. CNiverville, N. YPost Road	2.5 s	3		* * * *	0.0.0		d. c.	stor.	oil
P. M Romulus, Mich Alexis, O	37.0 d	* * *		60			d. C.	Stor.	elec.
Pac. Elec Dominguez, Cal San Pedro	9.4 d	* * *		43			a. c.	* * * * * *	elec.
Los Angeles, CalWatts	7.5 f	* * *		78			a. c.	stor.	elec.
Watts, Cal Dominguez Jct	5.9 f	* * *		56			a. c.	stor.	elec.
Indian Village, CalSierra Park	2.1 f	* * *		32	0 0 0		a. c.		elec.
Dominguez Jct., CalLong Beach	7.1 d	* * *		19			a. c.	0 0 0 0 0	elec.
Vineyard Jct., CalSawtelle	6.7 d	* * *		23	0 0 0		a. c.		elec.
Valley Jct., CalNo. Pomona	4.6 s	* * *		63			a. c.		elec.
	19.0 d			* * *	* * *				
No. Pomona Jet., Cal. San Bernardino	27.2 s	*** *		82		TT-11	a. c.		- 21
P. & R Bryn Athyn, Pa Newtown	11.2 s	31 d	0 0 0	0 0 0	0 0 0	Hall	d. c.	prim.	oil
lvyland, PaNew Hope	16.0 s	29 d	* * * *			Hall	d. c.	prim.	oil
S. P Ashland, Ore Portland	31.5 s	* * *	51			U. S. & S.	d. c.	prim.	elec.
Eugene, Ore Powers	10.6 9		6			U. S. & S.	d. c.	prim.	elec.
Zuleka, OreAshland **	12.7 s	* * *	65	0 0 0		U. S. & S.	d. c.	prim.	elec.
Wyo, OreTehama	3.7 s	* * *	2		0 0 0	U. S. & S.	d. c.	prim.	oil
Elmhurst, Ore Santa Clara	31.6 s	* * *	59			U. S. & S.	d. c.	prim.	elec.
Hot Wells, Tex Ysleta	102.2 s	* * *	177			U. S. & S.	d. c.	prim.	elec.
Millican, Tex	6.0 s	* * *	6	0.010		U. S. & S.	d. c.	prim.	elec.
Corsicana, Tex	7.0 s		6			U. S. & S.	d. c.	prim.	elec.
Palmer, Tex.	6.5 9	* * *	6			U. S. & S.	d. c.	stor.	elec.
U. PDenyer, ColLimon	88.2 s	* * * *	176			U. S. & S.	d. c.	stor.	elec.
L. A. & S. LGuelph, Nev Las Vegas, Nev	59.0 s	106				U. S. & S.	d. c.	prim.	oil
O. S. LOrchard, IdaNampa	44.6 s		115			U. S. & S.	d. c.	stor.	elec.
W. P	.3. s	* * *	2			U. S. & S.	a. c.	prim.	oil
M. P. 137.5M. P. 137.8	.3 s	6.0.0	2			U. S. & S.	d. c.	prim.	oil
M. P. 139.2M. P. 139.4	.2 s	* 0 0	0.00			U. S. & S.	d. c.	prim.	oil
M. P. 140.8M. P. 141.0		* * *	2	0.0.0		U. S. & S.	d. c.	prim.	oil
M. P. 152.4	.3 8	* 0.0	2		* * *	U. S. & S.	d. c.	prim.	oil
M. P. 178.5M. P. 178.8	.3 s		2			U. S. & S.	d. c	prim.	elec.
WabashLogansport, IndPeru	12.5 8	17							elec.
Danville, Ill.	.9 s	4						prim.	oil
Montpelier, O	1.5 s	2						prim.	oil
Granite City. Ill	.7 8	2						prim.	elec.
Nameoki, IllGranite City	3.0 d	6	* * *	* * *	* * *				
	1,294.3 s 352.9 d	770 60 disc	679	629	76				
	15.5 f								
NOTE: s-single track; d-double track; t-three track; f	four track	k,							

United States and 54 in Canada. The number of power levers proposed for the United States is 694, while none are proposed for Canada. The total number of levers proposed for 1924 is 1,140.

### Remote Operation of Switches

The installation of remote control power-operated switches has increased rapidly during the past year, and more roads are making installations of this character than ever before. It is interesting to note that 45 such installations were completed during 1923 and that 46 were under construction at the end of the year while 16 more are proposed for 1924. Fifteen roads completed installations last year. Of these the New York, New Haven & Hartford and the Missouri Pacific completed 8 each, the Great Northern, 7, and the Chicago, Burlington & Quincy, 4.

Twelve roads had remote control installations under construction on December 31, 1923. Of the total of 44 under way, the Santa Fe has 18, the Illinois Central 7, and the Chicago, Milwaukee & St. Paul, 4.

Six roads propose to make a total of 16 installations of remote control apparatus during the present year. Of these the Santa Fe proposes to put in 7; New York, Chicago & St. Louis, 3; and the Atlantic Coast line, 2. No doubt a number of additional installations of this character will be authorized later, as many roads have not as yet decided on their budgets. Many of the installations being made are for passing sidings and outlying switches and at entrances and exits of yards where they are controlled from stations or interlocking towers. Other installations are also being made to protect outlying crossings and junction plants, these locations often being controlled from adjacent interlocking plants.

## Automatic Train Control

The selection by the railroads of the type of train control to be installed under the Interstate Commerce Commission's order is proceeding rapidly. A large part of the work during the past year has been done by committees appointed by the different railroads to study and recommend the types suitable for their service. The induction type, both intermittent and continuous, is favored by the majority of the railroads and a number of installations of a test character are being made.

During the past year the Chicago, Rock Island & Pacific completed its installation of an intermittent electrical contact type on 165.4 miles of double track between Blue Island (Chicago) Ill., and Rock Island, and this installation was

AUTOMATIC	TRAIN CONTROL COM	PLETED IN 1923
	mi. of road Intern	nittent induction type
U. P.* 5.24 2.5	mi. of road Contin	uous induction type nittent electrical contact type

\*Note: Continuous induction type installed on double track, intermittent electrical contact type installed on eastbound track and intermittent induction type on westbound track.

Automatic Train Control Under Construction on December 31, 1923
A. T. & S. F..... 47.4 mi. of road.... Continuous induction type

A. T. & S. F 47.4 mi. of road	Continuous induction type
B. & O 8.2 mi. of road	Intermittent induction type
N. Y., N. H. & H. 10.5 mi. of road	Continuous induction type
N. & W 106 mi. of road	
P. & R 54.1 mi. of road	
St. LS. F 5 mi. of road	Intermittent induction type
S. P. (Pac. Sys.) 49.6 mi. of road	Intermittent induction type

AUTOMATIC TRAIN CONTROL PROPOSED FOR 1924

A.	T.	&	S.	F.			.176.8	mi.	of	road	Continuous	induction	type
B.	80	0.					. 28.1	mi.	of	road	Intermittent	induction	type
											Continuous		
C.	of	N.	J				. 66	mi.	of	road	Continuous	induction	type
C.	M.	. &	St	. I			.107.5	mi.	of	road	Type not de	cided	-
P.	M.						. 37	mi.	of	road	Continuous	induction	type
9	P	CP	200	0	120	1	24 4	F77.1	of	road	Intermittent	induction	type

inspected by representatives of the Interstate Commerce Commission and approved by the Commission on December 17, with certain reservations, as reported in the Railway Age for December 22, 1923, page 1148.

The Chicago & Eastern Illinois has notified the Commis-

The Chicago & Eastern Illinois has notified the Commission that it will comply with the specifications and eliminate the permissive feature on its engine equipment by the installation of a positive stop valve.

## TABLE D-INTERLOCKING PLANTS INSTALLED DURING 1923

	2		Working levers			Remarks on special features Approach, route and detector locking, electric
	Crossing, junction or	Mechan-		Electro- pneu-	move- ments at outlying	signals at mechanical plants. If plant rebuilt, levers added only
Read Location A. AToledo, O	terminal Xinos	ical	trical	matic	switches	Four plants rebuilt.
A. T. & S. F. Owasso, Okla.  Cameron, Tex.  Milano, Tex.	Xing	2	8		···i	Temporary interlocking for construction company.
Milano, Tex.	Xing		24		* * *	Approach, route and detector locking.
Kern Jct., Calif Dalies, N. M	Junction		14			Approach, route and detector locking. Approach, route and detector locking.
Fifth Street Edelstein, Ill.	X-over	2		• • •	• • • •	
Princeville, Ill	X-over					Rebuilt for automatic train control. Light signals on passing tracks for heading out. Light home signals
Williamsfield, Ill. Appleton, Ill. Knox, Ill.	X-over					at Appleton, Princeville and Monica.
A. C. L Hardesville, S. C	.X-over	8	8		2	Approach, route and detector locking.
A. C. L. Hardesville, S. C. Chatham, Ga. Drayton, S. C. Bennett, S. C.	.Terminal	6	7 4			Approach, route and detector locking.  Approach, route and detector locking.
Bennett, S. C South Tower, Ga	· Junction	13	2	* * *		Approach, route and detector locking. Moved and
North Tower, Ga	.Junction	15	8			rebuilt. Approach, route and detector locking. Revised.
Doctortown, Ga			9			Approach, route and detector locking. Moved and revised.
Burroughs, Ga Sayannah, Ga	. Junction and Xing.	59	0 0 0			Approach, route and detector locking. Revised. Four electric signals added, circuits and plants revised.
Telfair Washington, N. C	Xing	12				Two electric signals added, circuits and plants revised.
Washington, N. C.  B. & O. Hobbs, W. Va. Milford Jet. Ind. Clayton, Md. Chicago, 49th St. Poplar, Md.	Xing	45			* * * *	Electric detector locking. Electric detector locking.
Clayton, Md Chicago, 49th St	Xing	58				Electric detector locking. Electric detector locking.
						Electric detector locking. Electric distant signals.
Back Cove Bridge, Me. Harrowsmith, Ont.	.Swing span	17	4	• • •		Double track swing span. Electric distant signals.
Van Brussel Oue	Xina				* * *	Derails on lumber line, signals on C. N. Detector locking.
Bridgeburg, Ont. Lachute, Que. St. Cloud, Que. Hurdman, Ont.	Xing			***	***	Rebuilt, no levers added. Rebuilt, no levers added.
Hurdman, Ont Minto, Ont	Xing	8			***	Interlocked home signals. Four automatic signals protect crossing.
G. T	Xing	23	23			Route and detector locking. Electric approach, route and detector locking.
Cookshire, Que	. Xing	*** ***	4			Interlocked desk circuit controller, 4 levers, 7 functions.
Chatham, Ont	Xing	31		***	* * *	Rebuilt, 3 levers and 1 electric signal added.  Automatic control of derails on street railway by trolley contractors.
C. R. R. of N. J Nequehoning, Pa			56	• • •		Approach, route and detector locking. A. C. track circuits.
C. R. I. & P Des Moines, Ia	- PERSONAL RECK		20		· · i	20 levers added. Route and detector locking.  Desk controller, route and detector locking.
C. & N. W Dakota Jet., Neb			4		1	Control 2,000 ft. from switch. Route and detector locking.
C. & E. IGoodwine, Ill			3 3 10		4	Approach and detector locking, electric distant signals. Switch connected to old plant. Electric locking. Operated from existing plant. Complete electric
C. B. & QMendota, Ill D. & HMechanicville, N. Y			57			locking.  Approach route and detector locking.
Schenevus, N. Y	. Junction	21			* * *	Approach route and detector locking. Power high signals. Switch 2.000 ft, from telegraph office.
South Jet., N. Y Valcour, N. Y	•End pass, trek		• • •		1	9 desk controllers, switch and signals 11,735 ft. from office.
D. L. & WRoseville Av., N. J Mt. Pocono, Pa	<ul> <li>End 3-trck</li> </ul>		2	21	···i	Approach, route and detector locking.
G. N Atwater, Minn Pennock, Minn	<ul> <li>End dbl. trck</li> </ul>	4	* * * *		* * * *	Route locking. Route locking.
Campbell, Minn	· End dbl. trck	4				Route locking. Route locking.
Wheelock, N. D	•	4	***		2	Route locking. Route locking.
Nyack, Mont	*	9	6		2	Route locking. Route locking.
Delta, Wash Paola, Mont	· Draw bridge	10	10		3	Route locking.  Automatic interlocking for gauntlet track.
Essex, Mont. Snow Sher 12				0 0 0	* * *	Automatic interlocking for gauntlet track. Automatic interlocking for gauntlet track.
Lurgan, N. D	Tarm			10		Automatic interlocking for railroad crossing.
Livonia Ave	Vard			32		Approach route and detector locking, electric signals.
I. CMonee, Ill	X-over and Junctio	n. 29	12		* * *	Approach route and detector locking, electric signals.  Approach route and detector locking, electric signals.
Manteno, Ill	X-over	7	6 2			Electric levers added to existing plant. Electric levers added to existing plant. Approach route and dectector locking added.
Pectone, Ill	X-over End pass, trek		2		··i	Approach route and dectector locking added.
Memphis Ict., Ky	Junction	20	4		1	Approach route and detector locking added.
M. PCochrane, Kan Nearman, Kan	End siding	2			1 2	Approach and detector locking, 6 electric signals.  Approach and detector locking, 6 electric signals.
Wolcott, Kan Stilwell, Kan	End siding	4			2 2	Approach and detector locking, 6 electric signals.  Approach and detector locking, 3 electric signals.
Wagstaff, Kan Kansas City, Kan	End siding		2	• • •	1	Approach and detector locking, 1 electric signal.
M. K. T, Frisco Red River	Xing	2	4		• • •	Approach and detector locking. Electric functions south of river.
Me. CPortland, Me., Term.,	Junction Xing and Term	31	8		1	
Rigby Tower 2, Rigby	Term	21	2	9 0 0		
River Jct.	Junction	26	5 4			
N. Y. N. H. & H Auburn, R. I	X-over	48	12		8	Approach route and detector locking, 30 light signals.
N. Y. CAmsterdam, N. Y	X-over		24	• • •		Plant rebuilt, levers added as shown. Plant rebuilt, levers added as shown.
N. Y. N. H. & H. Auburn, R. I.  N. & W. Bluestone Jct., W. Va., N. Y. C. Amsterdam, N. Y.  Manitou, N. Y.  Iona Island, N. Y.  Albany Bridge, N. Y.	X-ower		5 2		• • •	Plant rebuilt, levers added as shown. Plant rebuilt, levers added as shown.

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M. K

C. C.

Consider	Wo	rking le	vers	Electric switch move-	Remarks on special features Approach, route and detector locking, electric
Crossing, junction or Road Location terminal	Mechan-	Elec-	Electro- pneu- matic		signals at mechanical plants. If plant rebuilt,
T. & O. CWest Columbus, OXing and junction.		5			Approach, route and detector locking, electric signals.
M. CCharlotte, MichXing		26			Detector locking.
Detroit, Mich	23				Detector lecking, power signals.
N. Y. & L. B Red Bank, N. J Xing and junction.		6			Six levers added to control detector locking.  2 levers added, electric home signals and lights.
N. Y. & L. B Red Bank, N. J Xing and junction. Oceanport, N. J Drw. bridge Matawan, N. J Xing and junction.	2	4		0 0 0	4 levers added for locking, electric signals.
N. Y. C. & St. L. Green Springs, O. Xing and Junction.	32	7		· · i	
N. P	13	0 0 0	0 0 0		Power distant signals, approach locking and an- nunciators.
Buffington, Minn Xing	13				Cabin interlocking power signals, approach locking.
Moorehead, MinnXing			* * *		Addition of power, home signals and approach locking.
Fargo, N. DXing and junction.		* * *		* * *	Addition of power, home and distant signals and approach locking.
Casselton, N. DXing and junction.					Fitte death to the ballon
Penn. Highlandtown, MdXing	8	14		* * *	Light signals, electric locking.  Electric switch locking, approach locking.
EasternTyrone, PaXing  Delaware Jct., DelXing	12	13		i	Electric switch locking, approach locking.
Schuylkill Haven, PaOutlying		2	1	î	Dietite auten formig, appround toomig.
Leesport, PaXing		2			
Rockville, PaJunction		11			11 electric levers added to 52 lever mechanical plant.
Various plants		46	***	* * *	Electric locking added at 11 various plants total 46 elec. lev.
CentralAspinwall, PaX-over and Junction Carnegie, PaJunction			41		Approach route and detector locking.
Carnegie, PaJunction	58	12	* * *	***	Rebuilt approach route and detector locking. Rebuilt approach route and detector locking.
Sturgeon, PaOutlying North Warren, OXing	23	7 14	***		Approach, route and detector locking light signals
West Rechester, OJunction	8	10			on Penn.  Approach, reute and detector locking light signals on Penn.
East Palestine, OX-over		7	* * *		Approach, route and detector locking light signals on Penn.
Columbiana, OX-over		7			Approach, route and detector locking light signals on Penn.
Alliance Jet., OJunction		9		***	Approach, route and detector locking light signals on Penn.
Massillon, O		5	* * *	***	Approach, route and detector locking light signals on Penn.
Loudonville, O		4	0 0 0		Approach, route and detector locking light signals on Penn.
Leetsdale		9			
NorthwestToledo Jct., OJunction	5		0 0 0		Levers added.
Calumet Park, IllXing	6			* * *	Also detector locking added.
P. & RCrestline, OJunction	0	6	32		A. C. control, approach, route and detector locking.
Atlantic City, N. I Draw bridge		20	0.00		Approach, route and detector locking.
Atlantic City, N. JDraw bridge Pacific ElectricSanta Fe Springs, CalifXing	10	4			Approach and detector locking.
La Habra, CalifXing		4			Approach and detector locking.
SouthernLudlow, KyTerm		22		3	Terminals for Cincinnati Yard and Ohio River bridge.
S. P Draw bridge	4				Detector locking, electric signals.  Mechanical signal changed to power, approach and
Merced, CalifXing		22		***	detector locking.
Redwood Jet., CalifJunction Kern Jet., CalifXing		32 24	***		Approach, route and detector locking.
T. & PPlaquemine, LaDraw bridge	. 4	4.7	***		4 levers added approach and detector locking.
U. PTopeka, KanJunction		17			
Council Bluffs, Iowa,, Terminal		23			Rebuilt, 23 levers added, total 119.
Omaha, Neb. "A"Terminal Omaha, Neb. "B"Terminal	** ***	4	* * *	* * *	Rebuilt, 4 levers added.
Omana, Neb. B Terminal	00 000	4	* * *	***	Rebuilt, 4 levers added.
Total	1,089	805	137	45	

#### TABLE E-INTERLOCKING PLANTS UNDER CONSTRUCTION, JANUARY 1, 1924

	TABLE	E-INTERLOCKING I	PLANTS U	NDER	CONSTR	RUCTION	, JANUARY 1, 1924
			Wor	king le	vers	Electric switch	Remarks on special features
Road I.	ceation	Crossing junction or terminal	Mechan- ical	Elec- trical	Electro- pneu- matic	move- ments at outlying switches	Approach, route and detector locking; electric signals at mechanical plants. If plant rebuilt, levers added only.
A. T. & S. F Eld	orado, Kan	Tunction	7	10		5	Low-voltage storage battery charged by rectifier.
Elli	nor, Kan	Junction	10	15		13	Low-voltage storage battery charged by rectifier.
Ply	nouth, Kan	Junction	5				Rebuilt, 5 levers added.
Ful	lerton, Cal	Xing	12				Approach and detector locking.
C. N	t Arthur, Ont	Xing	8				Rebuilt, 8 levers added.
		Ont. Xing			* * *		Automatic half interlocker.
	William, Ont	., Fred.			***	***	Automatic half interlocker.
		Xing					Power distant signals.
		Xing					Automatic plant
		Junction				***	Rebuilt, approach, route and detector locking and electric high signals.
C. R. of N. JTur	nel, Pa	End double trk	6	4		3	Rebuilt, 8 electric signals; approach, route and detector locking.
Por	t Reading, N.	JX-overs	16	10			Rebuilt, 10 electric levers, 17 electro-pneumatic sig-
C. R. I. & PMa	ole Hill Kan	Y-overs	20	2		2	nals added. Approach, route and detector locking. Power signals.
C & W IChi	cago 74th St.	Tunction	20	79	***		Approach, route and detector locking.
C. & N. W Fre	eport Line Ic	t		34			Celor light signals, route and detector locking.
Clir	ton. Ia	Xing		57			Color light signals, route and detector locking.
Kic	capoo, Ill	Tunction		3		i	Color light signals. Switch 2 miles from office.
		Tunction		3		1	Route and detector locking; 1/2 mile control.
C. M. & St. PDel	mar, Ill	Xing	18			4	Approach, route and detector locking. Rebuilt, 18 levers added.
C. & OWh	ite Sulphue V	W. VaEnd pass. trk	0	2			Approach, route and detector locking.
Cov	ington. Va.	End pass. trk	4	4		· i	Approach, route and detector locking.
Lvr	chburg. Va.	Xing		-	23		Approach, route and detector locking.
I. C	newood. Ill.	X-over		63			Appreach, route and detector locking.
Ric	ton, Ill	X-over		79			Approach, route and detector locking.
Clif	ton, Ill	X-over	6	7			Approach, route and detector locking, electric signals.
		X-over	18	12		2	Approach, route and detector locking, electric signals.
Nor	th Gilman II	1X-over	40			5	Approach, route and detector locking,
		Junction 180th St			44	-	Approach, route and detector locking.
	te P Ave	Junction 240th S			52		
Test	me Ave	Junction yard		* * *	50	***	
L. IOut	ene N V	Y aver			10		Approach soute and detector lealing
	Doule M	X-over					Approach, route and detector locking.
		YTerminal		* * 1	21		Approach, route and detector locking.
		YJunction		4			Approach, route and detector locking, 4 levers added.
Hol	113, N. Y	Junction	5		* * *		Approach, route and detector locking, 5 levers added.

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			Wor	king lev	ers	Electric switch
Road	Location	Crossing, junction or terminal	Mechan- ical	Elec- trical	Electro- pneu- matic	move- ments at outlying switches
М. Р		Drw. bridge Drw. bridge				2
M. K. & T		Junction		* 11		1
N. Y. C	Rotterdam Jct., N. Y	Junction		56		* * *
	Lyons Jct., N. Y	Junction	. 15	9	* * *	
	Geneva, N. Y	X-over	. 45	14	* * *	
Ind. H. B		Xing		8		***
N. Y. C. & St. L	Madison, Ohio	Siding	. 8			
N. P	Minneapolis, Minn	Xing and junction		39		
Penna	Huntingdon, Pa	Outlying H M tower.	15	20		3
1		Outlying G C tower		4		
	Renova, Pa			11		
	Southport, N. Y			5		
	Southport, IV. 1	Outlying		3		
	Crafton, Pa	Outlying	9	4		
		Outlying		9		
		Yd. entrance		22		
		Junction OX		5		* * *
		Junction MS		10		* * *
		Xing Erie		4		
				2	* * * .	
	Mansheld, O	Xing B. & O		6		* * *
	Detroit, Mich	Xing D. T. & I			* * *	* * *
	Wolf Lake, Ind	Xing	3	8	* * *	* * *
P. R. T					6	* * *
Phila. & W. Cheste	r.69th Street	Terminal			69	
P. & R	Camden, N. J	Terminal			59	
c P		Xing	1			2
S. F		Xing		18		_
	Perumont Tox	Xing	2			
		Xing				
		Xing				
*				40		
11 D	Eagle Lake, 1ex	Xing		40	* * *	
0 6 1	Payance Tde	End double track		2		1
	Reverse, Ida.			8		
L. A. & S. L	Fullerton, Cal			-	* * *	
227 2 . 1		Xing		17	* * *	* * *
Wabash	Mich	Xing		17	* * *	***
			380	709	334	46

Remarks on special features
Approach, route and detector locking, electric
signals at mechanical plants. If plant rebuilt,
levers added only

Rebuilt 4 electric signals added. Rebuilt 4 electric signals added. Electric switch machine for main line switch.

Eight electric levers added.
Electric signals, route locking.
Approach, route and detector locking.
Position light signals, Electric switch locking.
Position light signals and 4 levers added.
Position light signals and 11 levers added.
Position light signals, switch, approach and route locking.
Rebuilt.
Rebuilt.
Approach route and detector locking.

Approach route and detector locking.

Levers added, detector locking.

Levers added, detector locking.

Position light signals.

Approach, route and detector locking.

Approach, route and detector locking.

Approach and detector locking.

A. C. circuits and light signals.

A. C. control, approach, route and detector locking.

Levers added.

Levers added with approach and detector locking.

Approach route and detector locking added.

Approach and detector locking. D. C. plant. A. C. track circuit, electric plant.

#### TABLE F-INTERLOCKING PLANTS CONTEMPLATED FOR 1924

				Consider	Wor	king lev	rers	Electric switch	Remarks on engist features
		Road	Location	Crossing, junction or terminal	Mechan-	Elec- trical	Electro- pneu- matic	move- ments at outlying switches	Remarks on special features Approach, route and detector locking electric signals at mechanical plants. If plant re- built, levers added only
Α.	C.		Uceta, Fla	Tunction	8	7			Approach route and detector locking.
ZA.	0.	2	Tampa, Fla., No	JunctionXingJunction	10	2	***		Approach route and detector locking.
			Parkton, N. C	Junction	8	8	* * *	* * *	Approach route and detector locking.
			Pembroke, N. C	XingXing	12	6 2			Approach route and detector locking.  To be rebuilt, approach, route and detector locking.
			Pag Dee S C	Tunction	19				To be rebuilt, approach, route and detector locking.
			St. Stephens, S. C	Junction End double track	8	. 6		2	To be rebuilt, approach, route and detector locking
A.	Т.	& S. F	Ft. Worth, Tex	Xing & Junction.		60			Approach route and detector locking.
			Bird Siding, Tex	Xing	12				Approach route and detector locking.
			Gulf Jct., Tex	Junction	12	* * *		* * *	Approach route and detector locking.
			Wallis, Tex	XingXing			* * *	1	Added, approach, route and detector locking.  Added, approach, route and detector locking.
			Milano, Tex	Xing		* * *		1	Added, approach, route and detector locking.
			Temple, Tex	Xing				î	Added, approach, route and detector locking.
			McGregor, Tex	Xing		* * *		1	Added, approach, route and detector locking.
			No. Ft. Worth, To	exXing				1	Added, approach, route and detector locking.
n	6	0	Saginaw, Tex	Xing		* * *	* * *	1	Added, approach, route and detector locking.  17 plants to be rearranged and detector locking added.
B.	9. 1	0	Westfort Ont	Xing					Rebuilt for double track, color light signals.
C			West Portage Ma	inXing					Rebuilt
			Delta Tct., Man	Xing					Automatic plant to replace plant destroyed by cyclone.
			West Tower, Man	Xing				* * *	Approach and detector locking.
			Moncton, N. B	Xing End double track	18				To add 3 switches, electric locking and electric
C.	&	E. I		Xing		***			signals. Route and detector locking, electric, home and distant
0 1	n .	T 0 T	Latimas Van	End double track	12				signals.  Rebuilt 10 levers added. Color light signals.
C	E 7	V W	Elmhurst, Ill	Junction	10				Rebuilding.
C. 1	UK. a		Melrose Park, Ill.	Yard entrance					Rebuilding, 5 levers added, color light signals.
			Chase Wie	Tunction		5		* * *	Approach route and detector locking.
C. 1	M	& St. P	St. Paul, Minn	Junction Terminal End yard Terminal	17		***		Classification yard.
C. 8	k C	)	Russell, Ky	Terminal		* * *	10	***	Details not decided. Classification yard.
			Clifton Forge Va	Terminal			18		Details not decided.
			Clifton Forge, Va.	End of yard			***		Details not decided.
			Ashland, Ky	End of yard					
			Balcony Falls, Va.	End of vard			***	1	
			Cliffside, Ky	End of yard		***	* * *		Rebuilt.
	-0	-	D-K Cabin, W. V	aEnd 3 & 4 track laDraw bridge	12	6	* * *	* * *	Details not decided.  Details not decided.
F. 1	Lea.	C	Lacksonwille Fig.	Draw bridge				* * *	Details not decided.
			Stuart Fla	Draw bridge				***	ivetails not decided.
			Jupiter, Fla	Drawbridge					Mechanical plants, details not decided.
G. 3	Y		White Earth, N. D	End double track					
			Kootenai Falls, Mo	ontEnd double track				***	
		_	Troy, Mont	End double track			69	* * *	
1. 1	₹. '	T	148th St	Yard	**** ***	* * *	67		
				Junction			24	* * *	
			164th Ct	lunction			11	***	Details not decided.
K. (	0.	& G	Baxter Springs, M	oXing					Add 3 levers.
L. 8	k P	V	Louisville, Ky., "A	o Xing A" Wye is Xing Xing Xing			* * *		Route and detector locking, electric signals.
M. :	St.	P. & S. Ste. 1	M.Junction City, Wi	isXing	20	* * *	* * *		Route and detector locking, electric signals.
		William .	Waukesha, Wis	Xing	22	* * *	* * *	* * *	Cabin plant, manipulated by switchmen. Cabin, approach and detector locking, automatic dis-
3.5	27	e m	Fond du Lac, Wis	Ying	12		***	***	tant signals.
All.	11.	ox 1	Lancaster, 1ex	Xing				***	Cabin, approach and detector locking, automatic distant signals.
			ocualia, Mc	Amy					

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	Consino	Wor	king lev	ers	Electric switch	Remarks on special features
Road Location	Crossing, junction or terminal	Mechan- ical	Elec- trical	Electro- pneu- matic	move- ments at outlying switches	Approach, route and detector locking, electric signals at mechanical plants. If plant rebuilt, levers added only
N. Y. C Selkirk, N. Y	Terminal		60			Approach, route and detector locking.
Niverville, N. V.	Junction		42			Rebuilt, 11 levers added.
I. H. B Bellwood, Ill	Xing	11				
N. Y. C. & St. L., Mortimer, O	Xing	24	8		1	
Manle Grove, O	Xing	. 41				
Fostoria, O	Junction	. 15	10		2	Electric signals, route locking.
Vermillion, O	Sidings	12				Electric signals, route locking.
Westfield, N. V	Sidings	8				Details not decided.
	Xing		0.00		0 0 0	Approach, route and detector locking. Details no decided.
P. & RSchuylkill Haven, l	Pa					Low-voltage distant control, approach and detecto locking.
S. P Moor, Nev	End double track		5			Additional cross-over installed.
Woodland Cal	Xing		32			Eight levers added.
Flore Col	Xing and junction.		8			Rebuilt.
Oakland Cal	Xing		-	71		Approach, route and detector locking.
San Francisco, Cal.	Tunction		17			Rebuilt.
Nand Yet Col	Junction	8				Additional functions to protect spur.
Glendale, Cal	Xing	16				Low voltage operated by interlocking circuit con troller.
Plus Canon Tet C	alJunction		2			Approach and detector locking.
Houston Tem	Xing		35			Detector locking.
T. & PMelville, La	Draw bridge					Detector locking.
			0 0 0		0 0 0	Levers added account changes.
	Draw bridge		ii	0 0 0		Levels added account changes.
T. R. R. A. of St. L. S. H., St. Louis	Junction					Rebuilt.
Venice, Ill	Junction		0 0 0	0 0 0		Reputit.
U. P Borie, Wyo	Junction		39	0 0 0	0 0 4	
Summit, Neb	Xing					
Granger, Wyo	Junction		32	0 0 0		
	mXing		26		* * * *	
O. S. L Orchard, Ida			43	0 0 0	1	
Wabash Detroit, Mich				* * 0		
Bement, Ill			12			
Salisbury, Mo So. Adrian, Mich	Junction		0.00	000	1	
		446	486	208	16	

During the past year four other railroads report having made installations of varying lengths, mostly for test purposes; seven railroads report installations under construction on December 31, 1923, and seven roads make reference to installations to be made during the coming year. These are tabulated on page 64.

The mileage listed in the tables above represents miles of road. Some roads are also making a rearrangement of their signals, better to co-ordinate their signal system with the train control system, while others are making changes in existing interlocking plants to accommodate the proposed train control installations. As three of the roads have their installations practically completed, this leaves 46 roads on which work will be pushed actively during the present year.

#### General Outlook

The consensus of opinion expressed by signal department officers regarding the mileage of automatic signals and the number of interlocking plants which should be installed during the coming year to meet traffic conditions adequately indicates that approximately 4,400 miles of automatic signals and 102 interlockings should be installed. The labor situation and the lack of trained signalmen reported from certain parts of the country will have a tendency to slow up an extensive construction program.

## Developments in the Signal Field

An outstanding feature of the year was the study given to the economics of signaling, not only by a committee of the Signal Section of the American Railway Association but by individual railroad officers. Another development was the increased use of color-light and position-light signals for day and night service.

The past year has been one of intensive rather than extensive development of apparatus. The engineering activities have been divided between work on such subjects as automatic train control and refinements in existing apparatus to secure greater reliability and economy. There has also been a clearly defined extension of the use of alternating current in the signal field. The installation of power operated devices increased rapidly as is shown in the introduction of electric levers at mechanical interlocking plants.

Crossing watchmen are being replaced in many localities

by automatically controlled and operated devices giving 24-hr. service, in lieu of the 8-hr. or 12-hr. protection provided by a watchman. The railways are divided between the use of the wig-wag and the flashing types of signal.



An Austrian Crossing Watchman

## Receiverships and Foreclosure Sales During 1923

Mileage Operated by Receivers on December 31, Totaled 12,949; at End of 1922, 15,596

From the standpoint of receiverships established or from that of foreclosure sales the year 1923 was rather uneventful.

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24rided The Railway Age compilation shows that there were at the end of the year 63 roads in receivership as compared with 68 at the end of 1922. The operated mileage in the hands of receivers as of December 31, 1923, totaled 12,949. This compared with 15,596 at the end of 1922 and represented the smallest mileage in the hands of the receivers since 1912.

There were placed in receivership in 1923 only ten roads with a total operated mileage of 2,218. Of this total mileage, the larger part was included in the lines of the Minneapolis & St. Louis which to be exact made up 1,650 miles, or approximately four-fifths of the total. The Minneapolis & St. Louis receivership was the result of adverse railroad conditions in the northwest, which, added to the general financial difficulties of the property finally necessitated the appointment of a receiver on July 26, 1923.

Roads sold at foreclosure totaled 8 with an operated

RAILROADS	IN	THE	HANDS	OF	RECEIVERS	

Name of road	operated		receivership	Funded debt outstanding	Capital stock outstanding	Total old company securities	Remarks
Atlanta, Birmingham & Atlantic  Birmingham & Southeastern  Birmingham, Columbus & St. Andrews	48	637 51 19	Feb. 25, 1921 July 26, 1920 Dec. 24, 1908	\$10,135,907 680,000 250,000	\$30,000,000 728,000	\$40,135,907 1,408,000 250,000	
Cape Girardeau Northern	104	104 17	April 14, 1914 Sept. 1, 1921	1,156,000	110,000 100,000	1,266,000 100,000	,
Central Indiana	127	118	Oct. 31, 1922	1,500,000	120,000	1,620,000	No bids on Dec. 3. Will be offered for sale again on March 17, 1924.
Chicago & Alton	247	686 235 202	Aug. 31, 1922 Aug. 1, 1914 Jan. 20, 1922	87,322,878 4,909,000 4,455,000	39,955,500 4,000,000 6,648,000	127,278,378 8,909,000 11,103,000	Sale postponed to Jan. 16, 1924.
Colorado Springs & Cripple Creek District		74	May 2, 1919	2,667,879	2,000,000	4,667,879	Sold Oct. 16, 1922. Operation dis-
Colorado, Wyoming & Eastern	13 15 50	111 13 15 50	Dec. 1, 1921 April 5, 1920 June 8, 1894 March 16, 1921	2,390,000 1,028,000 150,000	4,110,500 20,999 50,000 1,250,000	6,500,000 1,048,999 200,000 1,250,000	continued Jan., 1923.
Denison, Bonham & New Orleans	29	24	Apr. 1, 1923	350,000	25,500	******	P
Denver & Rio Grande Western  Denver & Salt Lake  Detroit, Bay City & Western  Eastern Kentucky  Ettrick & Northern	255 105 36	2,485 252 97 36 10	July 21, 1922 Aug. 16, 1917 Sept. 28, 1922 March 31, 1919 June 28, 1922	120,226,000 11,802,149 729,000 49,300	57,988,582 583,515 450,000 3,455,900 144,000	178,214,582 12,385,664 1,179,000 3,455,900 193,300	Reorganization plan approved by I.C.C.
Gainesville & Northwestern	37	35	June 28, 1922 Nov. 21, 1923	75,000	750,000	825,000	T 1 - 6 - 1 ( 1 - 1 - 1
Gainesville Midland	405	74 402 99	Feb. 15, 1921 March 27, 1915 Jan. 24, 1921	973,011 8,616,000 2,001,461	550,000 8,695,000 500,000	1,523,011 17,311,000 2,501,461	To be offered for sale Jan. 1.
Hampden Railroad Corp		15	March 17, 1921	2,000,000	1,400,000	3,400,000	Not operated.
Helena, Parkin & Northern		15	July 3, 1919	65,000	100,000	165,000	Operation discontinued Dec. 15, 1922.
Houston & Brazos Valley	30 17	28 17	Oct. 28, 1915 Aug. 8, 1923	420,000 390,000	24,000 37,400	444,000 427,400	
Kansas & Oklahoma Kansas City, Mexico & Orient	. 19	19 260	Aug. 8, 1923 April 17, 1923 April 17, 1917	33,500,000	288,900 20,000,000	288,900 53,500,000	
Kansas City Northwestern	162	161 162	Feb. 27, 1917 Dec. 3, 1923	2,750,000	4,125,000	6,875,000	Operation suspended. Hope to resume. Leased by C. R. I. & P.
Loranger, Louisiana & North Eastern		8	Jan. 9, 1922	100,000	25,000	125,000	Leaded by C. R. I. a I.
Macon & Birmingham		97	Feb. 1, 1908	1,200,000	1,200,000	2,400,000	Operation discontinued Feb., 1923.
Manistee & North Eastern		183 65	Dec. 24, 1918 March 1, 1920	972,000 213,666	2,000,000 10,035	2,972,000 223,701	Operation discontinued. No bidders on Oct. 2.
Midland Railway	1,650 119	88 1,536 119	March 15, 1922 July 26, 1923 April 1, 1923	360,000 46,833,614 3,300,000	500,000 25,792,600	860,000 72,626,214 3,300,000	Operated for freight service only,
Muscatine, Burlington & Southern	55	49	May 20, 1921	569,900	750,000	1,319,900	Has applied to I. C. C. for authority to abandon.
Northwestern Terminal	7	7	Jan. 21, 1920	2,217,000	3,000,000	5,217,000	Denver & Salt Lake subsidiary.
Ocilla Southern	69	59	June 30, 1918 Jan. 11, 1918	416,000	265,000 250,000	681,000 250,000	To sell for \$250,000 on Jan. 1.
Ocklawaha Valley		54 51	Feb. 26, 1920	600,000	75,000	675,000	Operation discontinued Dec. 30, 1922.
Peoria Railway Terminal Pine Bluff & Northern		11 8	Aug. 3, 1922 Feb. 9, 1916	2,444,000	1,000,000 160,000	3,444,000 160,000	Under construction to Pine Bluff, Ark., 42 miles.
Pittsburg, Shawmut & Northern	210 23	190 23	Aug. 1, 1905	14,655,600	15,000,000	29,655,600 1,138,000	me, 70 mics.
Randolph & Cumberland	42	42	Feb. 8, 1922 Oct. 9, 1915	138,000 817,000	970,800	1,787,800	
Salina Northern	81 317	81 315	July 27, 1917 Aug. 14, 1914	1,500,000 5,087,421	1,143,300 315,000	2,643,300 5,402,421	Purchase planned by W. C. Eldridge, president Sugar Land R. R.
Sandy River & Rangeley Lakes Savannah & Atlanta	104 145	104 145	July 8, 1923 March 4, 1921	837,000 3,376,015	340,000 2,250,000	1,177,000 5,626,015	
Sharpsville Railroad	18	18	Jan. 21, 1897		350,000	350,000	
Tallulah Falls Railway Texas & Pacific	1,953	1,848	June 24, 1923 Oct. 27, 1916	1,519,000 60,059,590	323,400 38,755,110	1,842,400 98,814,700	Reorganization plan made public Nov. 26, 1923.
Timpson & Henderson Toledo, Peoria & Western Trinity & Brazos Valley Wellington & Powellsville West Virginia Midland Wichite State Control of the Control of	248 324	34 231 303 24 46 75	March 6, 1920 July 2, 1917 June 16, 1914 Sept. 28, 1923 May 20, 1920 Dec. 26, 1921	4,895,000 8,760,000 86,667 600,000	250,000 4,076,000 304,000 90,000 500,000 120,000	250,000 8,971,000 9,064,000 176,667 1,100,000 120,000	
Wichita Falls, Ranger & Ft. Worth Wichita Northwestern			Nov. 1, 1922	381,750	1,690,000	2,071,750	

12,949 12,494

#### SUMMARY OF FORECLOSURE SALES, 1876 TO 1923

#### ROADS GOING INTO RECEIVERSHIP, 1876 TO 1923

Year	Number of roads	Miles	Bonds and stocks	Year	Number of roads	Miles	Bonds and stocks
1876	30	3.840	\$217,848,000	1876	42	6,662	\$467,000,000
1877		3,875	198,984,000	1877	38	3,637	220,294,000
1878		3,906	311,631,000	1878	27	2,320	92,385,000
1879		4,909	243,288,000	1879	12	1,102	39,367,000
1880		3,775	263,882,000	1880	13	885	140,265,000
1881		2,617	137,923,000	1881	5	110	3,742,000
1882		867	65,426,000	1882	12	912	39,074,000
1883		1.354	47,100,000	1883	11	1.990	
1884	15	710	23,504,000	1884	37		108,470,000 714,755,000
1000	22	3.156	278,394,000			11,038	
1885		7,687		1885	44	8,836	385,460,000
1886			374,109,000	1886	13	1,799	70,346,000
1887	31	5,478	328,181,000	1887	9	1,046	90,318,000
1888		1,596	64,555,000	1888	22	3,270	186,814,000
1889	25	2,930	137,815,000	1889	22	3,803	99,664,000
1890	29	3,825	182,495,000	1890	26	2,963	105,007,000
1891	21	3,223	169,069,000	1891	26	2,159	84,479,000
1892	28	1,922	95,898,000	1892	36	10,508	357,692,000
1893		1,613	79,924,000	1893	74	29,340	1,781,046,000
1894	42	5,643	318,999,000	1894	38	7,025	395,791,000
1895	52	12,831	761,791,000	1895	31	4.089	369,075,000
1896	58	13,730	1,150,377,000	1896	34	5,441	275,597,000
1897	42	6,675	517,680,000	1897	18	1,537	92,909,000
1898	47	6.054	252,910,000	1898	18	2.069	138,701,000
1899	32	4,294	267,534,000	1899	10	1,019	52,285,000
1900	24	3,477	190,374,000	1900	16	1.165	78,234,000
1901	17	1,139	85,808,000	1901	4	73	1,627,000
1902	20	693	39,788,000	1902	5	278	5,835,000
1903	13	555	15,885,000	1903	9	229	18,823,000
1904	13	524	28,266,000	1904	8	744	36,069,000
1905	6	679	20,307,000	1905	10	3,593	176,321,000
	0	262	10,400,000		6	204	
1906	6	114	13,777,000	1906	7	317	55,042,000
1907	3	138	2,547,000	1907			13,585,000
1908	12			1908	24	8,009	596,359,000
1909		2,629	250,033,000	1909	2	859	78,095,000
1910	17	1,100	93,660,109	1910	7	735	51,427,500
1911	13	1,386	40,741,543	1911	5	2,606	210,606,882
1912	12	661	25,910,990	1912	13	3,784	182,112,497
1913	6	1,159	86,163,850	1913	17	9,020	477,780,820
1914	9	1,470	83,189,500	1914	22	4,222	199,571,446
1915	11	3,914	285,258,782	1915	12	20,143	1,070,808,628
1916	26	8,355	703,444,855	1916	9	4,439	208,159,689
1917	20	10,963	557,846,348	1917	19	2,486	61,169,962
1918	11	763	24,735,187	1918	8	3.519	242,090,800
1919	8	459	15,479,587	1919	7	244	11,886,779
1920	7	380	7,676,200	1920	10	541	21,620,150
1921	. 11	4.173	306,123,942	1921	14	1.744	63,872,113
1922	15	6,151	299,491,646	1922	12	4,330	109,821,082
1923	8	637	14,622,900	1923	10	2,218	87.913.581
	-					=1-10	0,,240,301

mileage of 637. No large road was included, the largest of the 8 being the Fort Smith & Western which operates 250 miles.

Comparison of the list of roads in receivership at the end of 1923 with the list of the end of 1922 shows three im-

RECEIVERSHIPS ESTABLISHED IN 1923

Name of road Mileage	Funded debt outstanding	Capital stock outstanding
Denison, Bonham & New Orleans 29	\$350,000	\$25,000 <b>750,000</b>
Gainesville & Northwestern	390,000	37,400
Kansas & Oklahoma	2,750,000	288,900 4,125,000
Minneapolis & St. Louis	46,833,614	25,792,600
Sandy River & Rangeley Lakes 104	3,300,000 837,000	340,000
Tallelah Falls Railway	1,519,000 86,667	323,400 90,000
	\$56,141,281	\$31,772,300

portant changes. One of these is the inclusion in the 1923 list of the Minneapolis & St. Louis already mentioned. Another is the elimination this year of the Missouri-Kansas-Texas and of the Toledo, St. Louis & Western, the former because of reorganization and the latter because of its con-solidation with the New York, Chicago & St. Louis. Reorganization of both companies-the Clover Leaf without a RAILROAD MILEAGE IN THE HANDS OF RECEIVERS

(Figures to 1921, Inclusive, from I. C. C. Statistics for Year Ended December 31, 1921)

40,819 37,856 30,476 18,862 12,745 9,853 4,178 2,497	2,963 7,380 11,614 6,117 2,892	192 169 151 128
30,476 18,862 12,745 9,853 4,178 2,497	7,380 11,614 6,117	151 128
18,862 12,745 9,853 4,178 2,497	11,614 6,117	128
12,745 9,853 4,178 2,497	6,117	
9,853 4,178 2,497		0.4
4,178 2,497	2 802	94
2,497	-6,074	71
	-5,675	52
4 477 5	-1.681	45
	-1.022	27
1,185	-290	27
1,323	+138	28
796	-527	26
3,971	+3.175	34
3,926	-45	29
9,529	+5,603	52
10,530	+1.001	44
5,257	-5,273	39
	-664	39
9,786	+5,193	44
16,286	+6,500	49
18,608	+2,322	68
30,223	+11,615	85
37,353	+7.130	94
34,804	*2,550	80
17,376	-17,428	82
19,208		74
16,590	-2,618	65
16,290	-300	61
13,512	-2,778	68
15,596		63
	1,475 1,185 1,323 796 3,971 3,926 9,529 10,530 5,257 4,593 9,786 16,286 18,608 30,223 37,353 34,804 17,376 19,208 16,590 16,290 13,512	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

		FORECLOSURE	SALES IN 1923
Name of road Carolina & Yadkin River Columbus & Greenville. Fort Smith & Western Marion & Rye Valley Maryland, Delaware & Virginia. Morgantown & Wheeling	Mileage 36 168 250 18 83 27	Funded debt outstanding \$1,288,600 200,000 5,244,000 174,500 2,000,000 730,000	Capital stock cutstanding \$1,840,000 50,000 1,500,000 345,800
Rome & Northern	23 32		1,000,000 150,000
	637	\$9,637,100	\$4,985,800

Will be operated by High Point, Thomasville & Denton R.R. Sold Aug 6, 1923

Sold April 25, 1923
Sold in three parcels at foreclosure, May 7, for total, \$650,000
Sold July 6, 1923, to Scotts Run Ry., who are now operating property
Sold April 10, 1923, for \$35,000
Sold March 17, 1923, for \$50,001

<sup>\*62,400</sup> shares no par value capital stock.

foreclosure sale—was nearly completed in 1922 but the two roads were included in the 1922 receivership list because the receivers had not been removed at the end of the year.

At the present time two important reorganizations are

pending. The plan for the reorganization of the Denver & Rio Grande Western, 2,604 miles, has already received the approval of the Interstate Commerce Commission. The Texas & Pacific, 1,953 miles, is also likely to be removed from receivership in the near future.

## Dividend Changes on Railroad Stocks in 1923

Increases Made on Several Important Issues—North Western Reduces Rate on Common

THE RAILROADS of the country as a whole will fail to report for 1923 net railway operating income equivalent to the 53/4 per cent on their tentative valuation which the Interstate Commerce Commission has determined to be a fair return. There was enough prosperity for the railroads, however, so that several roads were able to report earnings that permitted their directors to restore or increase dvidends. The Baltimore & Ohio, New York Central and Pere Marquette were outstanding instances. Stockholders of the New York, Chicago & St. Louis and those of the Louisville & Nashville gained in the one case through a consolidation and an increase in the dividends from 5 to 6 per cent, and in the other through a stock dividend of 62½ per cent and a dividend rate equivalent to 8½ per cent on the former capitalization, as compared with the 7 per cent which the company had been paying.

On the other hand, the adverse conditions in the northwest resulted in a reduction in the rate on Chicago & North Western common from 5 to 3 per cent and the passing of the 5 per cent dividend on Chicago, St. Paul, Minneapolis & Omaha common. Traffic conditions and expenses resulting from floods caused the Colorado & Southern to pass its 3

per cent dividend.

Details of dividend changes in 1923 by roads follow:

Baltimore & Ohio. Extremely favorable earnings of the Baltimore & Ohio enabled the directors of that company to put the common stock on a 5 per cent basis, this step being taken by them on September 26, with the declaration of a 1½ per cent quarterly dividend. Holders of Baltimore & Ohio common stock received a return of 6 per cent on their stock from 1907 to 1914. In 1915 they received 5 per cent, in 1918 their payments were only 4½ per cent and in 1919 only 2 per cent, no disbursements being made thereafter until the one in September of this year. Restoration of the dividend was confidently expected to be made in 1922 and the stock market was so optimistic that the stock went up in price sufficiently to discount a rate of 4 per cent. It was thought that the dividend declaration would follow from the necessity of restoring the dividends before the end of 1922, so as to maintain Baltimore & Ohio bonds as legal investments for savings banks and trust funds in New York and other states having similar requirements. bined effects of the coal and shop strikes made the dividend impossible and fortunately through a ruling of the state authorities the time in which the dividend would have to be restored to maintain the legal feature of the bonds was extended to the end of 1924. The maintenance of this market for bonds is important because of large maturities occurring in 1925. Earnings of the Baltimore & Ohio in 1923 were extremely good. For the first 11 months of the year the road reports a net operating income of \$41,529,435, approximately \$23,000,000 in excess of the net for the same

Chicago & North Western. The Chicago & North Western preferred dividends have been paid regularly since 1878,

the rate being 7 per cent from 1878 to 1881,  $7\frac{1}{4}$  in 1882, 8 from 1883 to 1885, 7 from 1886 to 1902, 8 from 1902 to 1919, and 7 per cent since. The common received in this period, rates of from 5 to 7 per cent. The rate on the common was 7 per cent from 1902 to 1919 and in 1920 was reduced to 5 per cent. Adverse conditions in the northwestern region and the failure of the net income to improve from the low levels of the war period, finally compelled the directors in December, 1923, to reduce the semi-annual dividend from  $2\frac{1}{2}$  to  $1\frac{1}{2}$  per cent, establishing a new rate of but 3 per cent. The North Western had a deficit after dividend payments in 1920 and 1921, and barely covered its dividend requirements in 1922.

Chicago, St. Paul, Minneapolis & Omaha. The Omaha had a dividend rate on its common stock of 7 per cent from 1905 to 1916. In 1917 it paid 6 per cent and thereafter to 1923 but 5 per cent. In December, 1923, at the same time the action reducing the rate on the common stock of the parent company was taken, the Omaha directors passed entirely the semi-annual dividend previously paid of 2½ per cent.

Colorado & Southern. Decreased traffic volume, interruptions to traffic due to floods and the heavy expenditures nectssary to restore the line, proved too much for the Colorado & Southern, with the result that the directors on December 6 announced that the annual dividend on the common stock would be passed. The regular preferred dividends were paid. The 3 per cent rate on the common had been paid in December, 1921, and 1922, but prior to that time no disbursements had been made since 1912.

Fort Dodge, Des Moines & Southern. In April \$1.75 was declared on the preferred, this being the first declaration since a dividend paid in scrip in May, 1921. The preferred in April, when \$1.75 was paid, had 12½ per cent in arrears.

Georgia Southern & Florida. The directors of this company in November declared semi-annual dividends of 2½ per cent on the 5 per cent non-cumulative first and second preferred stocks. These were the first dividends on these issues since November, 1920, when like amounts were declared.

Gulf, Mobile & Northern. This company succeeded the New Orleans, Mobile & Chicago in 1917. In October an initial dividend of one dollar was declared on the preferred stock, which is cumulative from January 1, 1920. The dividend was available for holders of voting trust certificates representing the stock in the hands of trustees. The payment put the stock on an annual basis of 4 per cent.

Louisville & Nashville. The former rate of 7 per cent on Louisville & Nashville common dated back to 1917, prior to which time varying rates had been paid regularly since 1864, except for the adverse periods of 1874-1876; 1883-1889 and 1894-1898. In March the company declared a stock dividend of 62½ per cent and declared a semi-annual dividend of 2½ per cent on the increased amount, equivalent to a rate of 8½ per cent on the common stock prior to

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the stock increase. In 1922, at the old 7 per cent rate, the stockholders received \$5,040,500. In 1923, with one  $3\frac{1}{2}$  per cent dividend on the former capitalization and one  $2\frac{1}{2}$  per cent dividend on the increased amount, the dividends totaled \$5,445,000.

Midland Valley. An initial dividend of 2½ per cent (\$1.25 a share) was declared in May on the preferred

Mobile & Ohio. Directors in July declared a dividend of  $3\frac{1}{2}$  per cent, followed by a similar amount declared in December, making a total for the year of 7 per cent, as compared with 4 per cent annually from 1910 to 1922.

New Orleans, Texas & Mexico. This company, which operates its own and subsidiary properties under the inclusive name of Gulf Coast Lines, had been paying 6 per cent on its common stock since December 1, 1920, when the initial quarterly dividend of 1½ per cent was declared. In February, 1923, the quarterly dividend was increased to 1¾ per cent.

New York Central. Dividends on New York Central common stock were at the rate of 5 per cent from February 1, 1915, to May 1, 1923. On June 14 the directors declared a quarterly dividend of 134 per cent, payable August 1, thereby establishing an annual rate of 7 per cent. The New York Central has for some period been earning at a rate considerably above the 5 per cent which it paid up to the middle of 1923. It was assisted in so doing by its own operations and by the marked improvement in the fortunes of its subsidiaries. The parent company owns 90 per cent of the stock of the Cleveland, Cincinnati, Chicago & St. Louis and 95 per cent of the stock of the Michigan Central. On its Michigan Central stock it is receiving 20 per cent dividends annually. The statement issued at the time the dividend rate was raised said, "The lines of the New York Central and controlled companies are located in a productive territory. They are well equipped and they are performing a great public service in transportation. In order to provide the enlarged facilities required to keep pace with the growth of business, it is necessary from time to time to secure additional capital. Such additional capital should come, partly at least, from the sale of additional stock. The stock of the company, as well as its bonds, must be made attractive to investors because future financing cannot with advantage be on the basis of a constantly increasing debt and a sta-tionary amount of stock." The New York Central on December 12 offered to stockholders of record January 2, the right to subscribe to additional common stock at par, in the rates of one share to each ten shares now held.

New York, Chicago & St. Louis. This company in July inaugurated semi-annual dividends of 3 per cent on the preferred and common stocks of the reorganized company constituted by the consolidation of the New York, Chicago & St. Louis, the Lake Erie & Western, and the Toledo, St. Louis & Western. The New York, Chicago & St. Louis, prior to the consolidation, had three issues of stock, first preferred, second preferred and common, on all three of which issues the dividends had been put on a 5 per cent basis.

Pere Marquette. Increasing prosperity of the state of Michigan due to the establishment there of the automobile industry, has resulted in rapidly increasing net income for the Pere Marquette. In January the directors declared an extra dividend of 2 per cent on the 5 per cent preferred stock, thereby clearing up all arrears on that issue. The preferred dividends were cumulative after January 1, 1920, but the first dividend was not declared until December, 1921, when 10 per cent was paid. The remainder of the dividends in arrears were paid in 1922, except for the final 2 per cent declared in January. In June, 1923, the initial dividend was declared on the company's common stock and that issue is now on a 4 per cent basis.

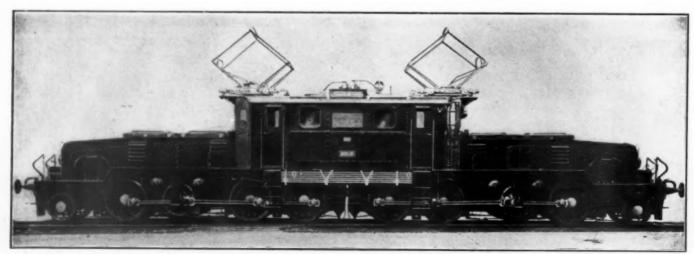
Richmond, Fredericksburg & Potomac. In January, this company issued \$5,417,400 dividend obligations, equivalent to 100 per cent on the voting common stock, guaranteed stock and dividend obligations, but not applying on the \$4,000,000 non-voting common stock.

Toledo, St. Louis & Western. In January this company declared dividends of \$4 on the common stock and \$4 on the preferred, the first dividend ever paid on the common and the first on the preferred since 1911. These issues were later exchanged for stock of the New York, Chicago & St. Louis, which see.

Vicksburg, Shreveport & Pacific. In November a dividend was declared of 2½ per cent on its common stock, the first on this issue since September, 1920.

Virginian. This company's preferred stock was formerly 5 per cent cumulative. In August, 1922, there was in arrears on this issue \$30 of dividends. In conformance with an agreement, the preferred stockholders surrendered their accrued dividends in return for the establishment of a 6 per cent rate, cumulative from August 1, 1922, which rate has since been paid. In December, 1923, an initial dividend of 4 per cent was declared on the common stock.

West Jersey & Seashore. In March the directors declared a 2 per cent dividend out of 1922 earnings, the first since September, 1920. The company formerly paid 5 per cent.



Express Passenger Electric Locomotive

Telegraph and Telephone Construction

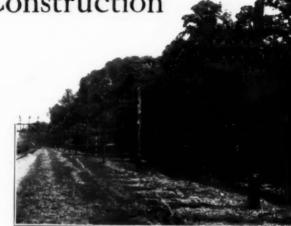
Pole Line Reconstruction and Telephone Dispatching and Message Circuits Leading Activities

By J. H. Dunn

THE EXTENSIVE replacement of old iron line wire with copper and the rebuilding of pole lines with heavier standards of construction occupied the major attention of railroad telephone and telegraph forces during 1923. The facts indicate that through telephone conversation circuits between general offices and division points and the gradual expansion of the telephone train dispatching facilities are becoming more generally recognized as necessities to meet the demands for service. The data for this, our fourth annual review of the activities of the railroad telegraph and telephone field, were furnished by 145 leading railroads, comprising about 86 per cent of the mileage of the United States and Canada.

#### Work Completed in 1923

During 1923 new construction was completed on 52 of the 145 roads reporting, as is shown in detail in Table 1. Telephone train dispatching apparatus was installed on 2,931.7



A Combination Cable and Open Wire Lead

miles of road in 1923 as compared with the extension of telegraph circuits for this purpose on 635.6 miles. This mileage for telephone train dispatching falls short of the record for 1922 by 1,046 miles. The largest installation of telephone train dispatching reported for the past year was 510 miles on the Los Angeles & Salt Lake, while the Baltimore & Ohio installed such apparatus on 450 miles and the Western Pacific on 438 miles. Telegraph dispatching circuits were installed on only 635.6 miles of road, the longest

	TABL	E 1. TE	LEGRAF	H AND	TELEPH	HONE	WORK (	COMPLETED	DURIN	IG 1923		
	Road	Road	Tolon	h	Offices	hana	Miles	of pole line	Railr	s of wire.		es. Metallic e circuits
	patched	miles dis-	Teleg	rapn	1 etep	none	Owned	Owned	for Tele	ng ½ joint g. & Teleph.		Message
Road	by	by telephone	Division or term.	Way	Block or way	Booth	exclusive	ly jointly with . Telegraph Co.		Copper	Dispatching	and
A. A									129			
A. C. L		124			25	5				496	124	
A. T. & S. F		89		6		****		89	116	1454	1112	24
B. R. & P			1			4				145.4		95.1
B. & O		450						0 0 0 0	16.6	0.7		611
E. & Q					0 0 0 0	1			10.0	30		
Chi. June.	***			****						1	****	
C. & O							12		6.5	17	24	
M. & S. P	5	18.5		1								
& N. W		292.5										192
N								0 0 2 0	194	1974		
Can. Pac							372		729	1218	146	
East	191	128							822	226	128	
D. & R. G. W					22	5				120	59.9	* * * * *
E. C										60	0 0 0 0	30
2. N	0 0 0					70				1546	479	168
C				7		32		0 0 0 0			258	165
7. & M. V								0 0 0 0		15		* * * *
. V											2.5	25
. I												26
. & N. E		6		10		22	3					527
i. K. T.							1.3					
I. P		156.8		27		22	****		31	954.7	160.2	582.6
& W												142
P				4					2.3	484		23:
. Y., O. & W							47			95		
. Y. C				12	10	20			45	558	45	267
T. & O. C				7	30					590	163	271
M. C				3	3	4				756		652
C. C. C. & St. L								6.2		14.4		****
. Y. C. & St. L		0 0 0 0				4 0 0 0				4.5		55
. Y., N. H. & H		200								4.5	400	
. M.		200 54						0 0 0 0		278	54	54
& R		34								210	34	3.4
enna.										37		9.75
East	0 0 0			3		10	0.8			18.2		37
Central	258	258	1	1	62	168			74.2	1476	341	243
N. W				i	10		7.5		155.7	1017.8	2	489
S. W					3	4				3.6	3.6	
P.												
Pacific System											104	878
					130							
A. I									67	9		
L, S. W									705			
P		21.5		2	2	2		11.7	50	23.4	21.5	
O. S. L		185				18			167	189	185	167
O. W. R. & N	46			6	10				46	239		85.6
L. A. & S. L	82	510		5		60		82	41	1294	510	
St. J. & G. I											****	1.1
V. P	58.6	438.4				32		25.4	42	869.8	876	
-	635.6	2,931.7	2	95	307	479	436.6	214.3	3,439.3	16,214.5	5,198.7	5,869.8

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circuit being 258 miles on the Northwestern Region of the Pennsylvania and the next 191 miles on the eastern lines of the Canadian Pacific.

Telephone conversation and message circuits were installed during 1923 to the extent of 5,869 miles, an increase of 4,042.2 miles over 1922. The Southern Pacific led with 878 miles, with the Michigan Central next with 652 miles, while the Chicago, Burlington & Quincy installed 611 miles. In all, 26 roads in the list of 52 reported extensive installations which indicates the growing tendency to provide modern communication between important points.

Two terminal telegraph offices were installed in 1923 and telegraph instruments were placed in service in 95 way stations. The increased growth of the telephone for local business is evidenced by the fact that telephone connections were established in 307 way stations. Sixteen roads recognized the desirability of providing telephone connections at sidings by installing a total of 479 telephone booth stations.

During the year a total of 436.6 miles of new pole line was built by the railroads and 214.3 miles of pole line was constructed jointly with telegraph companies. This mileage

Coast Line has a similar circuit of 110 miles under construction. Installations involving 1,888.7 miles of copper line wire are under way as compared with only 378 miles of iron wire. On the New York Central the connection of telephone circuits into 81 block or way offices is in progress. A total of 59 telephone booths are being installed at this time on the several roads reporting.

#### Construction Contemplated for 1924

The data for construction contemplated in 1924 were of necessity furnished in many cases before estimates for budgets were completed; therefore it is especially interesting to see that at least 33 roads have definite plans made for construction, as listed in Table 3. Only 30 miles of telegraph train dispatching circuits are planned on these roads for 1924, as compared with 1,657.7 miles of telephone train dispatching, divided between 10 different roads. These roads plan connections for 33 way telephone offices and 129 telephone booth stations for the coming year. The Canadian Pacific plans for 377 miles of new pole line, while 156 miles of jointly owned pole line is to be built by the Oregon Short

TABLE 2-TELEGRAPH AND TELEPHONE WORK UNDER CONSTRUCTION ON JAN. 1, 1924

		Road	Road			Offices		Miles	of pole line		s of wire.		les. Metallio
		miles dis- patched		Teleg	raph	Telepl	none	Owned	Owned	including ½ joint for Teleg. & Teleph			Message
	Road	by telegraph	by	Division or term.	Way	Block or way	Booth	exclusively			Copper Copper	Dispatching	and conversation
A	C. L		110 50	0 0 0 0		17	6		50	10	440 125	110 100	110
É	& O. B. & Q.		140							19		140	245 38
Č	& 0							12	0 * 0 0			24	****
10	Y. & M. V	13.7					40					232.2	
L	& N.			* * * *							130		90 65
M	[. P	****	31				2	31		13.8	13.8 198	13.1	iżi
N	Y. C					81			205	332	271	336	94
P	& R.	****	243				3		2.5		486 224.9	* * * *	111.7
	Total	13.7	574		5	98	59	43	52.5	378.8	1888.7	986.3	874.7

is exclusive of the extensive reconstruction of pole lines, which constituted one of the chief expenditures for communication facilities during the year. Only 3,439 miles of iron line wire was installed in 1923 as compared with 15,855 miles of copper.

Economical operation of railroad communication systems requires that the line wires be used for more than one circuit simultaneously. That the railroads are making a study of this opportunity and installing these special circuits to increase the capacity of existing lines is evidenced by the fact that during the year 7,380 miles of simplex circuits, 2,982 miles of phantom and, 1,657 miles of duplex circuits were installed. The largest installation of simplex circuits reported was on the Seaboard Air Line, totaling 1,815 miles, while the longest phantom circuit, 295 miles, is reported by the Toleda & Ohio Central.

#### Work Under Construction

The telegraph and telephone improvements which were planned for 1923 were nearly completed, as is shown by Table 2 which lists the work under construction as of January 1, 1924. Of the 17 roads now having work under construction, perhaps the most important item is 243 miles of telephone train dispatching on the Philadelphia & Reading, using 486 miles of copper line wire. The New York Central is also working on 366 circuit miles of telephone train dispatching. The Baltimore & Ohio has a conversation circuit of 245 miles under way and the Northern Pacific is working on a conversation circuit of 121 miles, while the Atlantic

Line. The installation of 14,601 miles of copper line wire is planned during 1924, as compared with 858 miles of iron line wire.

#### General Outlook Shows

#### Increasing Demand for Communication

The majority of the railroads are recognizing the need for the betterment and extension of modern communication facilities. The conscientious work of the members of the Telegraph and Telephone section, A. R. A. during the past few years has produced in ready form, circuits, data and general information regarding telegraph and telephone developments and methods of construction that serve as an accurate guide to the proper maintenance and construction of railroad communication facilities. By this means detailed engineering studies are available to all, and the majority of the roads are quick to grasp this opportunity; as a result their problems are being solved more readily and on a uniform, scientific basis.

At the request of the Railway Age letters were received from 50 superintendents of telegraph of the leading roads, giving detailed accounts of the recent developments of special interest in the field and outlining the general prospects for 1924. Of these 50 superintendents of telegraph, 22 believe that prospects are bright for the approval of telegraph and telephone budgets, while 11 consider that finances will not permit further extensions at present. Only one road considers the present facilities adequate to handle the present traffic. This reveals the fact that the growth of traffic

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January 5, 1924

and the increasing demand for quick, reliable, satisfactory communication is outstripping the expansion of telegraph and telephone construction, and that a radical increase in the construction program is necessary.

Of the roads making specific statements as to the facilities which should receive first attention, 12 mention the extension of telephone train dispatching, while 14 consider the installation of telephone message and conversation circuits as of first importance. In order to meet the immediate demands for adequate service, 33 of the roads state that a total of 18,018 miles of wire are needed. Telephone train dispatching circuits are needed at once on at least 1,500 miles of road, and telephone conversation circuits are reported as authorized on about 500 miles.

Pole lines that have seen their natural service life are being replaced with heavier and more modern types of construction. Of 25 roads making mention of the state of their pole line maintenance 12 estimate that their maintenance is up to date, seven are from one to two years behind, and six from four to five years behind. In order to take up this

strictly important railroad business; it has been the means of settling important matters and has thus eliminated considerable traveling and loss of time to busy railroad officers.

The installation of automatic telephone exchanges in shops has proved satisfactory in giving continuous 24-hour service at a minimum expense for operation and maintenance. Where through telephone circuits are in service between terminals that are equipped with local automatic exchanges, circuits are so arranged on a few roads that a man at a local phone can dial the number and establish the connection through to any office at the distant terminal.

Increased efficiency of telegraph repeater stations is being accomplished by the installation of concentration units and other devices. By the use of telegraph selectors and concentration units, one road reduced the operating force of 25 men at one office to 19 men. Although the telephone is becoming increasingly popular for train dispatching and long distance conversation the telegraph is holding its own for communication for which it is best adapted. For long distance messages, reports, etc., the printer telegraph renders

TABLE 3-TELEGRAPH AND TELEPHONE CONSTRUCTION CONTEMPLATED FOR 1924

	Read Road Offices			Miles of pole line		Miles of wire. Railroad owned		Circuit miles. Metallic telephone circuits				
	miles dis-	miles dis-	Teleg	raph	T	elephone			includin	ig ½ joint	terephone	
Road	patched by telegraph	by telephone	Division or term.	Way	Blo			Owned y jointly with Telegraph Co.	Iron	Copper	Dis- patching	Message and con- versation
A. T. & S. F									* * * *	1908	410	770
C. N								0.003	260	3,701		
C. R. I. & P										297		
C. & O											114	826
Can. Pac.							183	0 0 0 0	52	1,358	386	
West				35			194		388	1,752	772	
Col. & S	****	233								466	233	
D. L. & W										134		134
		128								396	198	68
Erie										252	****	
G. C. L							6.3					****
Kansas, O. & G		178									* * * *	
L. V					0 0 0 0					338		129
K. C. S						E.4					* * * *	
L. & N												491
N. Y. C. & St. L										2.4		374
N. P					0 0 0 0		42	0 0 0 0		34	* * * *	
N. Y., O. & W							42			305	* * * *	* * * *
N. Y. C		0000		3		. 20			52	1,038	48	205
T. & O. C											* * * *	213
B. & A											52	
M. C		109								349	109	
P. & L. E										130		65
N. Y., N. H. & H		204								408	204	
P. M.		122								244	244	
Penna.		144.7								24	187	542.8
								3			****	
									****		1,241	600
S. P										59		
U. P		126				20		156	156	553	380	173
O. S. L	30				32	3				184		
O. W. R. & N		410				2 5		0 0 0 9		665	410	92
L. A. & S. L		410			****		2				410	27
Virginian		3		0.000	1		3	* * * *		6	6	* 1 1 1
Wabash					****					****	640	570
Total	30	1,657.7	0000	38	33	129	428.3	159	858	14,601	5,634	5,315.8

deferred pole line maintenance it is reported that at least 2,800 miles of pole line must be rebuilt in 1924. The extensive use of wood preservatives for the treatment of poles on this reconstruction will increase the life of pole lines materially and cut down, in a period of years, the expense involved in pole line reconstruction.

#### Special Developments Increase Efficiency

The majority of the superintendents of telegraph consider the installation of telephone circuits for dispatching and for conversation between headquarters as the development of greatest importance for railroads. The ability to superimpose simplex telegraph and telephone, also phantom telephone circuits, on telephone physical pairs of line wires, is also now being regarded with favor because it reduces the cost of construction and maintenance of the telephone plant.

One of the southwestern roads, by installing three vacuumtube repeater stations, recently connected up a through telephone conversation circuit between two general offices that are 767 miles apart. This circuit is now very busy with a highly satisfactory and efficient service, especially where the line circuits are derived through a composite or phantom circuit without the exclusive use of wires for this circuit.

The Union Pacific recently installed a two-channel multiplex automatic printer on a simplexed circuit, thereby eliminating the necessity for at least one additional overland wire, and also speeding up the service and reducing the cost for each message. The Baltimore & Ohio recently placed in service a system of telegraph printers between its general office at 25 Broadway, New York, and its piers in New York harbor, and extending to the superintendent's office at St. George and to the yards on Staten Island.

The recent voluntary agreement of the American Radio Relay League to co-operate with the railroads in sending and receiving messages by radio in case pole lines are torn down, may prove to be of great assistance in case of sleet storms. Radio receiving apparatus specially adapted for service on moving trains has been demonstrated recently and further development of wired wireless apparatus for communication to and from moving trains is under way.

### Status of Accounts With the Government

U. S. R. A. Has Completed Settlements With Railroads and Most of Guaranty Has Been Paid

THE LONG and involved process of adjusting the accounts between the government and the railroads, which were taken under federal control in December, 1917, and relinquished nearly four years ago, is now approaching a conclusion. The Railroad Administration has completed its settlements with all of the important roads which it operated, which have been announced from time to time during the past two years. The Interstate Commerce Commission has completed the adjustment and has issued final certificates for payment by the Treasury Department of most of the accounts involved in the six-months guaranty allowed by the Transportation Act for the period following the termination of federal control.

More years must elapse, however, before all the financial relations between the railroads and the government, arising from the war and the government's assumption of railroad operation, can be terminated, because many railroads have given the government various forms of evidences of indebtedness for the capital expenditures made by the government and there are still outstanding many loans made by the Interstate Commerce Commission from the \$300,000,000 revolving fund established by the Transportation Act to help tide over the transition period.

#### Railroad Administration Settlements

Of the 241,194 miles of road taken over by the government, roads operating 178,045 miles had effected final settlement up to a year ago. Except for the short line roads which had a different status, the settlements, which involved original claims of the railroads amounting to \$1,014,511,000, have now been completed without litigation and a detailed report will soon be available. Up to December 1 the settlements represented original claims of \$953,473,000, although some of them were reduced during the course of the negotiations. This does not mean that the Railroad Administration has had to pay out anything like that sum since February, 1920, because the amounts due the railroads on current account, such as delayed payments of their guaranteed compensation as well as amounts for materials and supplies, under-maintenance, depreciation, interest and other items, have been offset against the amount of capital expenditures made by the government and charged against the com-panies. The Pennsylvania, for example, paid the government \$90,000,000 as the excess of its indebtedness to the government over the government's indebtedness to it. Some few roads paid the Railroad Administration for over-main-tenance but up to December the government had paid the railroads a net amount of \$188,401,235 for under-maintenance, including \$159,657,979 for maintenance of way and \$28,743,256 for maintenance of equipment. The roads had claimed an aggregate of \$668,000,000 for under-maintenance. A considerable part of the amounts owed by the railroads for capital expenditures has been funded.

There are still pending a good many claims against the Railroad Administration on the part of short lines and "third persons" such as claims of shippers for overcharges and loss and damage claims.

#### Six-Months Guaranty

The claims of the railroads for the six-months guaranty amounted to about \$657,000,000 but the Interstate Commerce Commission has reduced the amount after checking the accounts. Two years ago it estimated the amount pay-

able as about \$536,000,000 and in two annual reports since it has adhered to this estimate. As of October 31, 1922, the commission estimated that \$85,926,954 was still due the carriers. Up to October 31, 1923, final settlements had been made with 355 carriers, 110 cases had been dismissed and 202 cases were still to be disposed of. Certificates had been issued to the amount of \$501,322,674 (and the actual payments by the Treasury approximate that amount), leaving an estimated balance payable of \$34,677,325 and this has been somewhat reduced by additional certificates since the first of the year.

A total of 352 carriers, mainly short lines, had filed claims amounting to approximately \$25,000,000 for reimbursement of deficits for the federal control period under section 204 of the Transportation Act. At the date of its report the commission had certified \$8,205,630 on this account and after many claims had been dismissed or withdrawn, 92 were left for final disposition.

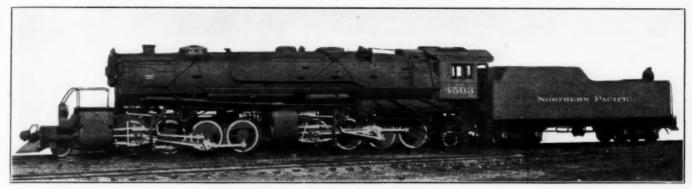
#### Loan Fund

Under section 210 of the Transportation Act which established the \$300,000,000 loan fund, the commission has allowed loans to the amount of about \$350,000,000, the original fund having been increased by interest and repayments. On December 1 a total of \$147,862,592 had been repaid. Under the law loans subsequent to February 28, 1922, have been made only on applications filed prior to that date but as recently as December 5 the commission allowed a loan of \$7,000,000 to the Boston & Maine.

The latest statement of the Treasury Department on the subject, as of December 1, shows total payments to the railroads under the Transportation Act amounting to \$893,-984,588, exclusive of the payments by the director-general of railroads, but this includes the loans, some of which have been repaid. During this year it will be possible to ascertain with some degree of accuracy the total cost to the government of federal control of the railroads, which is now estimated at \$1,700,000,000 to \$1,800,000,000, including approximately \$550,000,000 for the six-months guaranty period and the reimbursement of short lines, but the exact figure will not be known as long as the loans and the funded indebtedness of the carriers remain outstanding.



Wilson Station, Prague



Mallet of 128,000 lb. Tractive Force, Simple. Built by the American Locomotive Company for the Northern Pacific

### Record-Breaking Increase in Motive Power

Large Increase in Total Tractive Effort Follows Heavy Orders of 1922 and Production of 1923

THE LOCOMOTIVES ordered for domestic service in the United States during 1923 totaled 1,984, according to the compilations of the Railway Age reproduced in detail in tabulations in this article. This total is approximately 600 less than the total of 2,600 reported for 1922. It compares with 239 in 1921, 1,998 in 1920, 214 in 1919 and with amounts of 2,500 or more in the years preceding the last named date. Orders placed by railroads in Canada with Canadian builders totaled 116, comparing with 68 in 1922, 35 in 1921 and 118 in 1920.

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The same situation existed with reference to export business in 1923 as existed in 1922—it was conspicuous by its absence. There are shown in the tables which appear below

was the greatest for any year since 1918, in which year the production figure was 3,668; except for 1918, the figure was the largest for any year since 1913. The reason that the orders for locomotives were less than they were in 1922 while, on the other hand, the production was at a fairly high

TABLE II-ORDERS FOR LOCOMOTIVES SINCE 190	TABLE	s for Locomo	TIVES SINCE	1901
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	Domestic orders only	
Year	Loco- motives Year	Loco- motives
1901	. 4,340 1908	 1.182
1902	. 4,665 1909	 3,350
1903	. 3,283 1910	 3,787
1904		 2,850
1905	. 6,265 1912	 4,515
1906	. 5,642 1913	 3,467
1907	3 482 1914	 1 265

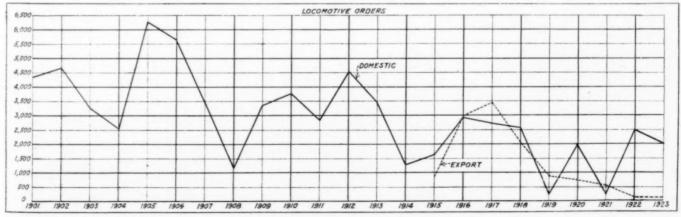
	Domesti	c and Foreign		
Year	Domestic	Canadian	Export	Total
1915	1,612	****	850	2,462
1916	2,910		2,983	5,893
1917	2,704		3,438	6,142
1918	2,593	209	2,086	4,888
1919	214	58	989	1,170
1920	1,998	189	718	2,905
1921	239	35	546	820
1922	2,600	68	131	2.799
1923	1.984	82	116	2.182

Prior to 1918, Canadian orders included under "Domestic."

only 116 locomotives ordered for export. This was even less than the total of 131 in 1922 and hardly comparable with the figures for preceding years back to 1915, the first in which the *Railway Age* showed the totals of export orders.

The number of locomotives built for domestic service in the United States during 1923 was 3,362, more than twice the total built in 1922, for which year the figure of domestic locomotive production was 1,303. The 1923 production, further,

figure is readily explained. It results from the fact that a large portion of the 1922 orders were placed in the latter part of 1922, so that the deliveries on the better portion of the 1922 business were not made until 1923. The situation at



Locomotive Orders, 1901 to 1923

present unfortunately is reversed. The buying movement of locomotives, which featured the latter part of 1922, continued in 1923 only until April and since that time the number of locomotives ordered has been comparatively small. By way of illustration, it may be noted that in the three months of July, August and September, 1922, the *Railway Age* reported in its columns orders for only 25 locomotives and for the last quarter, which, it is true, showed an improvement, only 108. On the other hand, by way of contrast, the orders in March, which was the best month of the year, totaled 514. Because of the fact that the number of locomotives ordered during the months since April was comparatively small, the builders were able to complete most of their holdover 1922 business and their new 1923 business before the close of the year 1923.

The Car Service Division for some months has been showing a total of locomotives on order. The last report is that for December, 1923. Whereas on March 15, 1923, there were on order a total of 2,113 locomotives, or on June 1 a total of 2,041, there was on order on December 1 a total of only 739. Inasmuch as the builders had been producing locomotives at the rate of over 350 a month, this means that they will go into 1924 with but a small amount of business on their books, and apparently enough business to last them only until about the end of January. This does not speak well for the possibilities of a large locomotive production in 1924 unless, of course, large orders for new locomotives are forthcoming in the near future.

The situation as to railway motive power was unquestionably one of the outstanding features of railway history during 1923. It has become the fashion to refer things in these

1	TABLE III—LOCOMOTIVES BUILT IN 1923† Domestic (United States, 3,362; Canada, 143)	3,505
1	foreign	280
	Total	3,785

Year	Domestic	Foreign	Total	Year	Domestic	Foreign	Total
1896	. 866	309	1,176	1910*	4,441	314	4,755
1897		386	1,251	1911*	3,143	387	3,530
1898		554	1,875		4,403	512	4,915
1899		514	2,475	1913†	4,561	771	5,332
1900		505	3,153		1,962	273	2,235
1901			3,384	1915†		835	2,035
1902			4,070	1916†		1,367	4,075
1903			5,152		2,585	2,861	5,446
1904			3,441		3,668	2,807	6,475
1905*	4,896	595	5,491		2,162	1,110	3,272
1906*		720	6,952		2,022	1,650	3,672
1907*	6,564	798	7,362		1,185	638	1,823
1908*	. 1,886	456	2,342		1,303	231	1,534
1909*	2,596	291	2,887	1923†	3,505	280	3,795

\*Includes Canadian output. †Includes Canadian output and equipment built in railroad shops.

days to the course of the business cycle. The locomotive market as it existed in 1923 seems to have been particularly susceptible to this sort of treatment although, of course, other factors entered into the situation due to the peculiar conditions which existed in the railway field. The business cycle experts, if we may for convenience give them that name, pointed out that business in 1923 was on a very high level in the first few months of the year and reached its peak about in April, after which time it dropped off. This is exactly what took place with locomotive purchasing, although in the case of locomotives the trend was exaggerated by the fact that the reason orders fell off after April was the substantial increase in locomotive prices.

Another important factor in the analysis of the business cycle at the present time is the point that most manufacturers will go into 1924 with a comparatively small quantity of orders remaining on their books. This again is exactly what has taken place in the case of the locomotive market. The analysts of the business cycle feel extremely optimistic concerning business conditions in 1924 and if business conditions in 1924 are good, naturally the railways will have

more favorable net income, and similarly the market for their securities should be more receptive. While no signs are as yet apparent of the resumption of locomotive buying in the near future, it is to be hoped that the improvement to be expected in general business conditions will be reflected similarly with reference to the purchasing of locomotives by the railways.

The Railway Age has on many occasions emphasized the point of view in its columns that one of the most important reasons for the very favorable record of transportation efficiency made by the railroads in 1923 was the substantial improvement in their motive power condition. This improvement was reflected by the reduction in the number of locomotives held for repairs requiring over 24 hours from 21 per cent in January to 13.7 per cent, which was reached on October 1. The reason for the improvement in locomotive conditions was twofold. Partly, it was due to the large amount of attention given to locomotive repairs and partly to the substitution of new and more powerful locomotives for smaller and unserviceable locomotives which were retired.

This factor is being given belated attention and credit in many quarters by people who have discovered that the efficiency of railway transportation in 1923 had a very substantial effect on the course of the business cycle. The point is made the stronger by comparison with 1920 because in 1920 railroad conditions were so poor that manufacturers and wholesalers had to duplicate their orders or enlarge their inventory because they could not get prompt deliveries. The result in 1920 was inflation and severe deflation in 1921. This condition did not exist in 1923. Railroad service was so prompt that enlarged inventories were entirely unnecessary. Further than that, the delivery of goods was so prompt as to make it unnecessary for the business man to go to his bank for increased credit and as a final result, we have at the present time substantial easiness in money rates. We did not have inflation in 1923 and there is no reason for deflation in 1924. On the other hand, it follows that conditions at the present time promise extremely favorable prospects for 1924. It does not seem unreasonable to say that the business world of this country can thank the mechanical departments of the railways and the locomotive builders for part of the present favorable status of affairs. This is said because it does not seem at all unreasonable to give considerable credit for the railroads' efficiency in operation in 1923 to the condition of locomotives.

The Car Service Division now makes monthly reports of locomotive installations and retirements. The latest tabulation of its figures shows that in the first 11 months of 1923, the Class I railroads installed 3,704 locomotives. This figure is not strictly comparable with the figure of locomotives built as compiled by the Railway Age for the present article. On the one hand, the Car Service Division total of installations includes Class I roads only, whereas the Railway Age total of locomotives built includes all purchasers. On the other hand, the Car Service Division figure includes as installed locomotives a considerable number of rebuilt locomotives on which the repair work has been sufficiently large in amount so that under the accounting rules the equipment must be retired and entered in the accounts as new.

The figure of 3,704 for 11 months is of particular interest because it is larger than the figure of new locomotives installed for any full year since 1913, in which year, according to the reports of the Interstate Commerce Commission, the number of locomotives installed by the Class I railroads was 4,381. There may be some question as to whether the figures reported by the Car Service Division are absolutely comparable with the figures reported by the Interstate Commerce Commission. It is not believed that such discrepancies as may exist can be important. They certainly cannot be great enough to harm the value of this additional measure of the great amount of progress made in the railway motive

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Cha Cha Cha Che Che Chi Chi power situation during the year which has just come to its close.

It is well known that the number of locomotives retired each year has been so near the number installed that there has not been, in recent years at least, much of a net increase in the total number of locomotives in service. At the end of 1922, the total in service was 64,512; less, actually, than at the end of either 1919, 1920 or 1921, although more than at the end of 1918. The 1923 installations will, it may be presumed, be sufficient to change this trend. At the end of November, 1923, according to the Car Service Division figures, the railroads owned 64,878 locomotives; more than at the end of 1922, although still less than at the end of 1921 when the ownership totaled 64,949.

It will be interesting to watch the figures for the following few months.

However, there has been substantial progress from the standpoint of additions to motive power capacity because with the introduction of larger locomotives and their replacement of lighter and older power, there has been an increase in the total locomotive tractive effort. The total tractive effort has shown a consistent increase year by year over an indefinite period, the annual increase ranging from 16,000,000 lb. shown in the year 1922 over 1921 to as high as 135,000,000 lb. shown for the end of 1918 over the end of 1917. At the end of 1922, the tractive power of the locomotives in service totaled 2,401,437,501 lb. according to the I. C. C. reports. The Car Service Division report for the end of November shows a figure of 2,532,051,290, an increase for the 11 months only of 131,000,000 lb. The total acquisition of motive power as shown in terms of capacity will for the

entire year 1923, therefore, apparently show the largest increase ever shown for any year, heavy retirements of old equipment in 1923 notwithstanding.

The total capital expenditure of the railroads in 1923 has been estimated at 1,075,897,940. Of this total amount, there was represented in locomotives the sum of \$212,225,204. The Bureau of Railway Economics tabulation of these figures shows a carry-over into 1924 of but \$20,665,385 for locomotives, which again indicates how small this carry-over is.

The locomotive orders which are listed in the accompanying tables are compiled from official sources. It will be seen that details are shown this year as to the purchaser, type, service, weight, cylinders and builder and that mention is made as to whether or not the respective locomotives will be equipped with mechanical stokers, feed water heaters, boosters and thermic syphons. In those cases where neither the notation "Yes" or "No" appears, the report was silent on the subject. In the lists some few omissions of small unimportant orders doubtless occur. The details presented were supplied by the railways and other purchasers of locomotives in response to inquiries from the Railway Age. They were checked against similar lists furnished through the co-operation of the builders and amplified by reference to the weekly reports in the Equipment and Supplies column of the Railway Age. Because of the short time available for the compilation and the haste necessary to insure its publication so close after the end of the year, the Railway Age does not desire to make any claims as to its scientifically statistical accuracy. However, the real purpose of the statistics is to allow comparisons of the year's business with that of other years, which purpose it is hoped they meet with entire adequacy.

#### Locomotive Orders for 1923

#### For Service in the United States

Purchaser	No.	Type	Service	Weight	Cylinders	Mech. Stoker	Feed Water Heater	Rooster	Syphon	Builder
A 400 - 100						Diones	renter	and date :		Heisler
Abertheny & Longhead Logg Co	1	Geared 2-8-0	Frt.	126,000 150,000	20 x 26	No	No	No	Yes	Baldwin
Akron, Canton & Youngstown	3	4-6-2	Pass.	278,000	25 x 28				Yes	Baldwin
Alabama & Vicksburg		0-8-0	Sw.	202,000	22 x 28	No	No	No	No	American
Aliquippa & Southern	1		40.000					***	240	American
Alten & Southern	1	0-6-0		130,000	20 x 26					American
		2-8-2	Frt.	307,000	27 x 30	Yes	No	No	No	American
Ann Arbor Atchison, Top, & Santa Fe	29	2-8-2	Frt.	326,300	27 x 32	No	Yes	No	No	Baldwin
Atemson, Top. & Santa Per	1	2-8-2	Frt.	326,300	27 x 32	No	Yes	No	Yes	Baldwin
A. & W. P. and Western Rv. of Ala	î	2-8-2	Frt.	288,000	26 x 30	No	No	No	No	Lima
A. a W. I. and Western My. of Amer.	1	4-6-2	Pass.	231,700	23 x 28	No	No	No	No	Company Shops
Atlantic Coast Line	20	0-8-0	Sw.	213,710	25 x 28	No	No	No	No	Baldwin
Attantic Coast Differentiation	25	4-6-2	Frt.	278,520	25 x 28	No	No	No	No	Baldwin
	7	2-8-2	Frt.	280,700	27 x 30	No	No	No	No	Baldwin
Atlantic Refining Co	1	0-4-0	Sw.	77,500	14 x 22					Baldwin
B. & B. Logging Co	î	Geared		94,000						Heisler
Baltimore & Ohio		2-10-2	Frt.	436,000	30 x 32	Yes	No	No	No	Lima
amidmore & omorror	50	2-10-2	Frt.	436,000	30 x 32	Yes	No	No	No	Baldwin
Belt Railway of Chicago	5	0-8-0	Sw.	246,000	$27 \times 30$	Yes	No	No	No	Baldwin
Birmingham Southern	1	2-8-0	*****	208,000	23 x 28					American
Bissell Lumber Co	1	Geared		72,000	*****					Heisler
Boston & Albany	8	0-8-0	Sw.	215,000	23½ x 30	No	No	No	No	Lima
Boston & Maine	10	4-6-2	Pass.	253,000	24 x 28	No	Yes	No	No	American
and the second s	10	2-10-2	Frt.	368,000	29 x 32	Yes	Yes	No	No	American
Boston Elevated	1	Electric	Sw.	20,000						Company Shops
Brown, Mark H	1	Geared		72,000						Heisler
Buffalo Creek	5	0-8-0	Sw.	209,500	$22 \times 28$	No	No	No	No	American
Buffalo, Rochester & Pitts	9	0-8-0	Sw.	233,000	$24\frac{1}{2} \times 28$	No	No	No	No	American
	5	4-6-2	Pass.	241,200	221/2 x 28	No	No	No	No	American
	14	2-6-6-2	Frt.	445,000	23½ & 37 x 32	Yes	No	No	No	American
	- 2	2-8-8-2	Frt.	576,900	28 & 44 x 32	Yes	No	No	No	American
Cal. State Bd. of Harbor Com	1	0-6-0	Sw.	147,900	$20 \times 24$					Baldwin
Cal. Western R. R. & Nav. Co	3	2-6-2	. Frt.	142,000	$18 \times 24$	No	No	No	No	Baldwin
Calumet & Arizona Mining Co	3	0-6-0		133,000	19 x 26					American
Cambria & Indiana	4	2-8-0	Frt.	272,000	26 x 30	No	No	No	No	American
Carolina, Clinchfield & Ohio	10	2-8-8-2	Frt.	534.000	25 & 39 x 32	Yes	No	No	No	American
	10	2-8-2	Frt.	316,000	$27 \times 30$	Yes	No	No	No	American
Central of Georgia	10	2-8-2	Frt.	300,500	$27 \times 30$	No	No	No	Yes	Lima
	8	4-8-2	Pass.	319,000	$27 \times 28$	No	No	No	Yes	American
	2	4-8-2	Pass.	319,000	27 x 28	No	Yes	No	Yes	American
Central of New Jersey	6	4-6-4	Pass.	291,600	21 x 36	No	Yes	No	No	Baldwin
0 . 111	10	2-8-2	****	343,000	$27 \times 32$		0.0.0	0.0.0		American
Central-Vermont	8	0-8-0	* * * * * *	200,000	22 x 28			0.0.0		American
Cl	16	2-8-0		227,000	$24 \times 32$			0.0.0	0 0 0	American
Champion Fibre Co	2	Shay	C	84,000	10 - 24					Lima
Charcoal Iron Co. of America	1	2-6-0 2-8-2	Sw.	122.000	18 x 24	NT.	37	3.7	87.	Baldwin
Charleston & Western Carolina		Shav	Frt.	233,400	$23 \times 30$	No	No	No	No	Baldwin
Cherokee Company		2-6-0	Pass. & Frt.	158,340	21 x 26	0 0 0	* * *	0 0 0	0 0 0	Lima Baldwin
Chestnut Ridge	1	2-8-2	Frt.	317,500	28 x 30	Yes	No	No	No	American
Chicago & Eastern Illinois	10	0-6-0	Sw.	190,000	28 x 30 23 x 28	No	No	No	No	American
Chicago, Indianapolis & Lcuisville	3	4-8-0	Frt.	192,000	21 x 26	No	No	No	No	Company Shops
	7	460	Pagg.	164,000	19 x 24	No	No	No	No	Company Shops
	3	4-6-0	Pass.	166.000	19 x 24	No	No	No	No	Company Shops
		7.0.0	4 455.	100,000	X 24	.40	.10	440	440	Company Shops

							Feed			
Purchaser	No.	Type	Service	Weight	Cylinder	Mech. Stoker	Water Heater	Booster	Syphon	Builder
Chicago, North Shore & Milwaukee Chicago River & Indiana		Electric 0-8-0	Sw. Sw.	100,000 219,000	25 x 28	No	No	No	No	General Electric
Chicago, R. I. & Pac	10	2-8-2 4-8-2	Frt.	369,000 377,000	28 x 30 28 x 28	 N.	***	27.	Yes Yes	American American
Chicago, Rock Island & Pacific	10	2-8-2 4-8-2 0-6-0	Pass. Sw.	332,000 369,000 139,000	28 x 30 28 x 28 21 x 26	No No	No No	No No	Yes Yes	American American Baldwin
Chicago, Wil. & Franklin Coal Co Chino Copper Company Clear Lake Lumber Co	4	0-6-0 2-6-2	Frt.	137,050	17 x 24	***		***	* * * *	American Baldwin
Clemons Logging Co	1	2-6-6-2 2-6-2	Frt. Frt.	220,000 120,650	17 & 26 x 24 17 x 24	***	* * * *	* * *	***	Baldwin Baldwin
Columbia Steel Corporation	1	0-6-0 0-6-0	Sw. Sw.	140,000 154,000	21 x 26 22 x 26	***		***	***	Baldwin Baldwin
Cornwall	2	0-6-0 0-4-0	Sw. Sw.	182,000 26,000	22 x 26 9 x 14	No	No	No	No	Baldwin Baldwin
Coxheath Lumber Co	1	Geared Geared		72,000 110,000	******		***	***		Heisler Heisler
Deer Island Logging Co Delaware, Lackawanna & Western	10	2-6-2 2-8-2	Frt. Frt.	118,000 356,500	17 x 24 28 x 32	Yes	No	Yes	No	Baldwin American
	10	4-6-2 4-8-2	Frt. Pass.	297,000 375,000	25 x 28 28 x 30	No Yes	No No	No No	No No	American American
Delta Hardwood Lumber Co Denver & Intermountain	1 4	Geared Electric	Frt.	64,000	******	***	***		* * *	Heisler Company Shops
Denver & Rio Grande Western	10	4-8-2 2-8-2	N. G. Frt.	378,600 156,000	28 x 30 18 x 22	Yes No	No No	No No	No No	American American
Detroit & Ironton Detroit Edison Co	2	Electric 0-6-0	Frt. Sw.	360,000 139,000	21 x 26		* * *	***	* * *	West'h'se-Ford Baldwin
Dolese & Shepard Co Donovan-Cockery Logging Co	1	0-6-0 2-8-2	Sw. Frt.	118,000 144,000	18 x 24 18 x 24	***	***		***	Baldwin Baldwin
East Broad Top	5	0-6-0 2-8-2	Sw. Frt.	137,000 320,400	21 x 26 28 x 30	No No	Yes Yes	No No	No Yes	Baldwin Lima
	1	2-8-2 2-8-2	Frt. Frt.	320,400 329,800	28 x 30 28 x 30	No No	Yes Yes	No Yes	Yes Yes	American American
Fairport, Painesville & Eastern Falling Rock Cannel Coal Co	1	0-6-0 Geared	Sw.	156,000 48,000	22 x 26					Baldwin Heisler
Florida East Coast	15	4-8-2 0-6-0	Pass. & Frt. Sw.	285,000 159,000	25 x 28 20 x 26	No No	No No	No No	Yes Yes	American American
Ford Motor Co	4	0-8-0 0-8-0	Sw.	213,000	25 x 28	***	* * * *			American Lima
Frost-Johnson Lumber Co Georgia Railroad Glendale & Montrose	3	2-8-2 4-6-0 040-040 Elec.	Frt. Pass. Frt.	153,800 182,300 100,000	19 x 24 21 x 26	No	No	No	No	Baldwin Company Shops
Grand Trunk Western	5	0-8-0 0-6-0	Sw. Sw.	249,000 180,000	26 x 30	No	Yes	No	No	West'h'se-Baldwin Lima
	5	4-6-2 2-8-2	Pass.	283,000 300,000	22 x 26 25 x 28 26 x 30	No No	No Yes	No No	No No	Lima American
Great Northern	5	0-8-0 4-8-2	Pass.	200,000 365,600	22 x 28 29 x 28	No	No	No	No	American American
Situat Avenue III III III III III III III III III I	10 26	4-8-2 2-10-2	Pass. Frt.	365,600 422,340	29 x 28 31 x 32	Yes	No No	No No	Yes	Baldwin Baldwin Baldwin
Greenbrier & Eastern	4	2-10-2 2-8-2	Frt. Frt.	422,340 237,220	31 x 32 23 x 28	No	No	Yes	No	Baldwin Baldwin
Gulf, Mobile & Northern	5	2-10-0 2-6-6-2	Frt. Frt.	254,000 211,130	25 x 30 17 & 26 x 24	No	No	No	No	Baldwin Baldwin
Hattiesburg Saw Mill Co Henderson-Baker Lumber Co	1	Geared Geared	*****	126,000 56,000						Heisler Heisler
Illinois Central	35 15	2-8-2 4-8-2	Frt. Pass.	282,700 362,500	27 x 30 28 x 28	No Yes	No No	No No	Yes No	Baldwin American
Indiana Harbor Belt	10 10	2-8-2 2-8-2	Frt. Frt.	304,500 304,500	25 x 32 25 x 32	No No	Yes Yes	Yes Yes	Yes Yes	American Lima
Ingham-Busnett Lumber Co International Harvester Co	1 1 1	2-6-2 0-4-0	Frt. Sw.	88,100 110,000	15 x 20 17 x 20	***	* * *			Baldwin Baldwin
Interstate P. S. Co	2	040-040 Elec. 2-8-8-2	Frt. Frt.	100,000 534,000	25 & 39 x 32	Yes	No	No	No	West'h'se-Baldwin American
Johnson, A. S., Lumber Co Kanawha & Hocking C. & C. Co	1	040-040 Elec. 2-6-2	Frt. Frt.	100,000 79,360	13 x 22		* * *	***	***	West'h'se-Baldwin Baldwin
Kansas City Southern	10	2-8-2 2-8-8-0	Sw. Frt.	186,000 500,000	20½ x 28 26 & 41 x 32	No	No	No	No	Baldwin American
Kentucky Lumber Co	5 2	0-8-0 Geared	Sw.	110,000	******		* * *	***		Lima Heisler
Lakeside & Marblehead Lassen Lumber & Box Co	1	0-6-0 2-6-2	Sw.	64,000	16 - 04			***		Heisler Lima
Lehigh Valley	40 10	2-8-2 4-6-2	Frt. Frt. Pass.	106,060 325,000	16 x 24 27 x 32 25 x 28	Yes	No	Yes	No	Baldwin American
Litchfield & Madison Long Bell Lumber Co	3 2	2-8-2 2-6-6-2	Frt.	283,800 275,000 200,000	25 x 30 18 & 28 x 24	Yes	No	Yes	***	American American
bong act annous committee	1 3	0-6-0 Geared	Sw.	140,000	21 x 26		• • • •	***		Baldwin Baldwin
Long Island Louisiana & Arkansas	5 2	0-8-0 2-8-2	Sw. Frt.	208,700	23 x 28 24 x 28	No No	No No	No Yes	No Yes	Williamette American
Louisville & Nashville	6 20	4-6-2 2-8-2	Pass. Frt.	259,000 277,000 292,000	25 x 28 26 x 30	No Yes	No No	No No	No	Baldwin American
Louisville, Henderson & St. L	10	2-8-2 4-6-2	Frt.	320,000 210,000	27 x 32 22 x 26	Yes	No	No	No	American American
Lyon, Hill & Co	1 2	4-6-2 2-8-2	Frt.	235,360	23 x 28			***	* * *	American American Baldwin
McKinley Land & Lbr. Co	1	2-6-2	Frt.	134,500	17 x 24			***	***	Baldwin Porter
Manary Logging Co	1	0-6-0 2-8-2	Frt.	86,000 122,000 158,200	16 x 24 17 x 24	No	No		***	Baldwin Baldwin
Manufacturers' Junction	1 2	0-6-0 0-6-0	Sw. Sw.	158,200 96,000 157,000	22 x 26 17 x 24		***		* * *	Baldwin Baldwin
Meridian Lumber Co Mesabi Iron Co	1	2-8-0 0-6-0	Frt.	157,000 165,000 202,700	20 x 26 21 x 26				***	Baldwin American
Midland Valley	1	2-8-2 Geared	Frt.	202,700 16 <b>0</b> ,000	26 x 30	Yes	No	No	No	Baldwin Heisler
Midland Valley Miller Logging Co Minn., Northfield & So Minnesota Steel Co	1	2-6-0 0-6-0	Sw.	152,000	21 x 26				***	Porter Baldwin
Minnesota Transfer	2 2	0-8-0 2-8-2	Sw. Frt.	203,640 251,000	24 x 28 23 x 28	No	No	Yes	No	Baldwin American
Missouri Pacific	25	2-8-2 2-8-2	Frt.	187,000 332,900	20 x 28 27 x 32	No Yes	No No	No No	No Yes	American American
	15 10	2-8-2 4-6-2	Frt. Pass.	332,900 316,600	27 x 32 27 x 28	Yes No	No No	Yes No	Yes Yes	American American
Mobile & Ohio	10	4-6-2 2-8-2 4-6-2	Pass. Frt.	274,600 290,000	25 x 28 26 x 30	No No	No No	No No	No No	Baldwin Lima
Nadawah Lumber Co	3	4-6-2 2-8-2 2-6-0	······································	114 650	10 - 24		***	* * *	***	Baldwin Lima
New Jersey Zing Co	1 5	2-6-0 2-6-0 Shay	Sw.	114,650	18 x 24	N.	No	***	22.	Baldwin Baldwin
New York, Chicago & St. Louis	30	2-8-2 4-6-2	Frt. Pass.	308 000	(3) 12 x 12 26 x 30	Yes No	Yes	No Yes	No No	Lima Lima
		7-0-2	1 435.	252,000	22½ x 26	No	No	No		American

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New Y Niagar Norfol Northe Norton Oaklar Ohio J Oliver Oregot Pacific Pacific Penns Penns

Peoria Philad Philad Pittsb Plymo Portla Portsi Public Public Pullm Red Repub

Rock St. L St. P St. I San Savar Seabo

Seboo Sewe Shell Sierr Simp Sincl South South

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							Feed			
Purchaser	No.	Туре	Service	Weight	Cylinder	Mech. Stoker	Water Heater	Booster	Syphon	Builder
New York, New Haven & Hartford	5	0-8-0 0-8-0	Sw. Sw.	216,000 216,000	25 x 28 25 x 28	No No	No No	No No	No No	American American
	9	4-8-2 4-8-2	Frt. Frt.	334,000 345,000	27 x 30 27 x 30	Yes Yes	Yes Yes	No No	No No	American American
New York, Ontario & Western	6	4-8-2 040-040 Elec.	Pass. Frt.	317,000 86,000	27 x 28	Yes	No	No	No	American West'h'se-Baldwin
Niagara Function Norfolk Southern	6	2-8-0	Frt.	191,430 80,000	22 x 28	No	Yes	No	No	Baldwin Heisler
Northern Redwood Lumber Co Norton Company	1	Geared 0-6-0	Sw.	123,640 250,000	19 x 24			***	* * *	Baldwin
Norwood & St. Lawrence Oakland Lumber Co	1	2-6-0 Geared	****	64,000 94,000	******		* * * *	***	* * *	American Heisler
Ohio Match CoOliver Iron Mining Co	10	Geared 0-8-0 0-8-0		210,000 210,000	23 x 28 23 x 28		000		Yes	Heisler American American
Oregon-American Lumber Co	1	2-6-2 040-040 Elec.	Frt. Frt.	149,500 <b>86,000</b>	18 x 24				Yes	Baldwin West'h'se-Baldwin
Pacific Electric	8	Electric		125,720	17 - 24			***		S. P. Shops
Pacific Gas & Electric Co Pacific Lumber Co Pennsylvania Power & Light Co	1	2-6-2 <b>2-8-2</b>	Frt.	180,930	17 x 24 20½ x 28			***		Baldwin Baldwin
Pennsylvania Power & Light Co	42	0-6-0 4-6-2	Pass.	176,000 308,890	22 x 26 27 x 28	No	No	No	No	Baldwin Company Shops
	40 37	4-6-0 0-6-0	Pass. Sw.	237,000 180,300	24 x 28 22 x 24	No No	No No	No No	No No	Company Shops Company Shops Company Shops
	375	0- <b>4-0</b> 2-10-0	Sw. Frt.	131,750 386,100	20 x 24 30½ x 32	No Yes	No Yes	No No	No No	Baldwin
Peoria & Pekin Union	2	4-8-2 0-8-0	Pass. Sw.	385,000 221,700	27 x 30 25 x 28	No	Yes No	No No	No No	Company Shops Baldwin
Philadelphia & Reading Philadelphia Electric Co. Pittsburgh & Lake Erie Plymouth Cordage Co.	25	2-8-0 0-4-0	Frt. Sw.	315,585 99,750	27 x 32 16 x 24	Yes Yes	No	Yes		Baldwin Baldwin
Pittsburgh & Lake Erie	10	0-4-0 Com. Air	Frt. Sw.	335,000 8,500	28 x 30 5 x 10		Yes	Yes	No	American Baldwin
Portland & Southwestern Portland Ry., Lt. & Pr Co Portsmouth By-Product Coke Co	1	2-8-2 Electric	Frt. Sw.	182,260 100,000	201/4 x 28	0 0 0				Baldwin General Electric
Portsmouth By-Product Coke Co Public Serv. Elec. Power Co Public Service Electric Co	1	0-6-0 0-6-0	Sw. Sw.	150,000 156,000	20 x 26 20 x 26	No	No		***	Baldwin Baldwin
Public Service Electric Co	1	0-6-0	Sw. Sw.	125,000 155,000	30 x 28 20 x 26	No No	No No	No	No	Porter American
Pullman Red River & Gulf Republic Iron & Steel Co	1	4-6-0 0-6-0	Frt. Sw.	140,600 97,000	19 x 26 17 x 24	No	No		*** *	Baldwin Baldwin
	1	2-6-0 2-6-0	Sw, Sw.	180,000 153,000	22 x 26 21 x 24	No No	No No	***	* * *	Baldwin Baldwin
	1 2	0-6-0 0-8-0	Sw.	166,000 224,000	22 x 26 25 x 28	No No	No No	* * * *	• • •	Baldwin Baldwin
Richmond, Fredericksburg & Pot	2	0-8-0 4-6-2	Sw. Pass.	270,000 287,000	26 x 28 26 x 28	No No	No No	No No	No No	American Baldwin
Rock Creek Lumber Co	2	4-8-2 2-8-2	Frt. Frt.	373,000 153,000	28 x 30 19 x 24	Yes	No	No	No	American Baldwin
St. Louis & O'Fallon	4	2-6-2 2-6-6-2	Frt. Frt.	195,000 208,000	20 x 26 17 & 26 x 24	No	No	No	No	Baldwin Baldwin
St. Louis Southwestern San Joaquin & Eastern.	15	2-8-0 2-6-2	Frt. Pass. & Frt.	243,775 128,000	25 x 30 17 x 24	No	No	No	No	Baldwin Baldwin
Savannah & Atlanta	20	2-8-2 2-8-2	Frt. Frt.	208,700 300,000	22 x 28 26 x 30	No Yes	No No	No Yes	No No	Baldwin American
Scappard All Disc	2	2-8-2 2-8-2	Frt. Frt.	300,000 300,000	26 x 30 26 x 30	Yes Yes	No No	Yes Yes	No No	American American
Seboomook Lake & St. John	i	2-6-2 2-8-2	Frt.	121,570	17 x 24					Baldwin Lima
Sewell Valley Shell Company of Calif. Sierra Ry. of California. Simpson Logging Co. Sinclair Refining Co.	î	0-6-0 2-6-2	Sw. Pass. & Frt.	127,000 106,200	19 x 24 16 x 24	No	No	No		Baldwin Baldwin
Simpson Logging Co	i	2-8-2 0-4-0	Frt. Sw.	180,440	19 x 24 14 x 22	No	No	No	No	Baldwin
Southern Pacific	12	2-10-2 2-10-2	Frt. Frt.	397,900 397,900	29½ x 32 29½ x 32		Yes Yes	Yes Yes	Yes No	American Baldwin Baldwin
	8 20	4-6-2 0-6-0	Pass.	305,330	25 x 30		Yes	Yes		Baldwin
	34	2-10-2 4-6-2	Frt. Pass.	397,900 300,000	29½ x 32 25 x 30		Yes Yes	Yes		Lima Baldwin
	10 18	4-8-2 4-8-2	*****	351,000 351,000	28 x 30 28 x 30			• • •		American
Southern Railway	10	2-8-2 2-8-2	Frt.	292,500	26 x 30	No Yes	Yes Yes	No No	No No	American American
Spans Chalfant & Co. Inc.	16	4-6-2 0-6-0	Pass. Sw.	326,000 299,000	27 x 32 27 x 28 19 x 24	Yes	Yes	No	No	American American
Spang. Chalfont & Co., Inc Studebaker Corp Sugar Pine Lumber	1	0-6-0 2-8-2		120,000	20 x 24	* * *	***		***	Baldwin American
Tennessee Central Tennessee Coal & Iron	4	2-8-2 2-10-2	Frt. Frt.	280,000 345,000	25 x 30 28 x 32	No No	No No	No No	No No	American American American
rennessee Coar & Iron	1	2-8-0 0-6-0	Frt. Sw.	208,000 169,000	23 x 28 22 x 26	No No	No No	No No	No No	American
Texas-Mexican	1	0-6-0 4-6-0	Sw.	141,000	21 x 26					American Baldwin
Thompson-Weils Lumber Co	1	2-8-0 2-8-2	Frt.	121,000	18 x 24		* * *		***	Baldwin Baldwin
Toledo, Angola & Western Toledo Edison Toledo, St. Louis & Western	1	Electric	Sw.	120,000	21 - 20	No	No	N.	N.	American General Electric
Toledo Terminal Tombigbee Logging Co	2	2-8-0 2-8-0 Geared	Sw. Frt.	190,000 200,000	21 x 28 22 x 28	No No	No	No No	No No	Company Shops American
FT. 1	1	Geared	Sw.	64,000 72,000	******			* * *		Heisler Heisler
Union Terminal Co. Upper Merion & Plymouth	10	0-6-0 0-6-0	Sw.	151,530	20 x 26				***	Lima Baldwin
Utah Copper Co	5	0-6-0 0-6-0	Sw. Sw.	160,000 157,540	22 x 26 21 x 24				***	Baldwin Baldwin
Valley & Siletz	15	2-8-8-2 Fire 292 292 292	Frt.	531,000	25 & 39 x 32	Yes	Yes	No	Ŷes	Porter American
Virginian	12	Elec. 282-282-282 (3 units each)	e	202 000	05 00	***	37.	37-	37-	West'h'se-Ame'can
Wabash	20 6 4	0-6-0 2-8-2	Sw. Frt.	202,000 341,500	25 x 28 27 x 32	No Yes	No Yes	No Yes	No No	American American
Western	20	2-8-2 2-8-2	Frt. Frt.	335,000 331,000	27 x 32 27 x 32	Yes Yes	Yes No	No No	No No	American American
Washington Run Webb Logging & Tbr. Co	1	Shay	Frt.	180,000		***	* * *	***	***	American Lima
West End Coal Co Wisconsin & Ark. Lumber Co	1	2-6-2 2-6-0	Frt.	163,700 111,690	18 x 24 17½ x 24		* * * *	* * *		Baldwin Baldwin
Wynooche Timber Co	1	2-6-2	Frt.	154,150	18 x 24	• • •				Baldwin
Canadian Beigo Paper Co., Ltd	1	0-6-0	Sw.	1ada 88,580	15 x 22	No	No	No	No	Canadian
Canadian National	10	0-6-0 0-8-0	Sw. Trfr.	175,900 242,750	22 x 26 26 x 30	No No	No No	No	No	Canadian Canadian
Canadian Pacific	8 20	2-8-2 2-8-2	Frt.	306,000 320,000	$26 \times 30$	Yes	Yes	No No	No No	Canadian Montreal
Canadian Pacific Canadian Pacific Quebec Development Co	16 8	4-6-2 0-4-0		310,000	25½ x 32 25 x 30				G	Montreal American
	6	0-4-0	Fee	79,000 65,000	14 x 22 13 x 20	NT.	Van	···	N	Montreal Montreal
Temiskaming & Northern Ont Toronto, Hamilton & Buffalo	2	2-8-2 4-6-2	Frt.	272,000 270,000	25 x 30 24 x 28	No	Yes	Yes	No	Canadian Montreal

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Purchaser	No.	Type	Service	Weight	Cylinders	Stoker	Heater	Dooster	Sypnon	
Antioquia, F. C. de (Colombia)	2	2-8-0					0 0 0	0 0 0		American
Argentine State Railways	- 1	4-8-2				0 0 0	0 0 0	0.0.0	0 0 0	Baldwin
	5	2-8-2							0.00	Baldwin
Arica-La Paz (Chile)	1	Rack				0 0 0	0 0 0			Baldwin
	1	Mallet						0 0 0		Baldwin
Atlantic Fruit Co. (Cuba)	2	2-8-0				0.0		4 2 0	0.0.0	Baldwin
Brazil	7	Various (	Orders			0 0 0		0 0 0		Baldwin
Caldes Ry. of Colombia	3	2-8-2				0 0 0		0 0 0		American
Central est Palma	1					0 0 0		0 0 0		American
Central Jaronu (Cuba)	. 1	4-6-0			* * * * * * *				0 0 0	Baldwin
Central Natividad (Cuba)	1	0-4-2			* * * * * *					Baldwin
Chilean State Railways	25	2-8-2						0.0.0		Baldwin
China	1	Various C			9 0 0 0 0 0 0			0 0 0	0.0	Baldwin
Cuba	13	Various (				0 0 0	0 0 0	0 0 0	0 0 0	Baldwin
Cyprus	1	Various (		* * * * * * * * * * * * * * * * * * * *					000	Baldwin
Dutch East Indies	1	040-040 Elec.	Pass.	140,000				0 0 0		West'h'se-Heemaf
	I	040-040 Elec.	Frt.	140,000						West'h'se-Heemaf
Empresa Mata Larangeria (Argentine)	1	2-8-0	*****					0 0 0		Baldwin
Grace, W. R., & Co	1		Sw.					0.0 0		American
Japan	1	Various C			0 0 0 0 0 0					Baldwin
Jamaica	1	Various C	Orders .							Baldwin
Lourenco Marques C. de F. de (E. A.)	2	4-6-2						100		Baldwin
Manchuria	6	Various C								Baldwin
Mexico	2	Various C	rders		* * * * * * *			9 0 4		Baldwin
Musashino Ry. (Japan)	3	040-040 Elec.	Pass. & Frt.	66,000				0 0 0		West'h'se-Baldwin
Norte de Cuba	2	0-6-0				0 0 0		000		Baldwin
Paulista Railway, Brazil	2	4-8-2		162,000	$20 \times 22$					American
	5	Electric		125,000						Gen'l ElecAmer.
Peru	1	Various C						0 0 0		Baldwin
Porto Rico	4	Various C	rders			0 0 0				Baldwin
Rede Sul Minera (Brazil)	2	2-8-0								Baldwin
	2	2-8-0								Baldwin
Santo Domingo	2	Various C	rders							Baldwin
South Manchurian	5	2-8-2		480.000						American
Spanish Northern	6	Electric	Pass. & Frt.	172,000						General Electric
Venezuela	2	Various C	Orders							Baldwin
Wonham, Bates & Goode Trad. Corp	1	Geared		64,000		0.0.0	0 0 0	0.0 0		Heisler

Dr. George Henry Taylor, railway medical officer of New South Wales, Sydney, in a paper on color testing read before the Australasian Medical Congress in Melbourne last autumn, and reviewing the experiences of a dozen years in the examination of railway employees in Australia, said:

"I am satisfied that a trained and observant color-blind person may remain undetected in one examination by the Williams' lantern (as modified, allowing the examiner to change the order in which the colors are shown) and the Edridge green lantern; but I am also satisfied that a person who can pass the modified Williams' lantern, the colors in which are restricted to red, green and white, without error, and who also satisfies a trained examiner that he is efficient in 1, 2, 3, 4, 5, and 8 of Stilling's plates, although he may still have an undetected defect, is safe, as a railway man, under any conditions in which color sense is a guide."

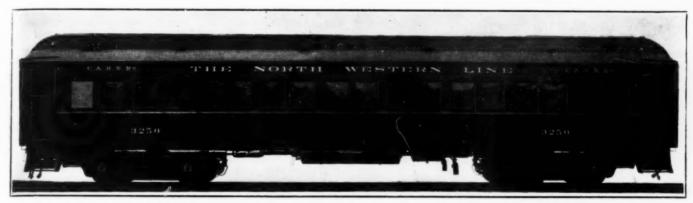
Dr. Taylor gave a brief sketch of the progress in color testing on the Australian Railways, where colored wools were used in 1886. Two years later, a card for testing both color and form was introduced, from England. In 1902, colored glasses were first used; and in 1904, Holmgren's wools and Williams' lantern were used together. This improvement detected some defects which up to that time had escaped, and there was resentment among the enginemen.

In 1915, Stilling's plates were adopted and used in conjunction with the modified Williams' lantern; and in 1922 these, together with the Edridge test, were made the standard throughout Australia. The wool test was abandoned in 1915; the work of examining men with the wools was slow and tedious, and exhausted the examiners.

Dr. Taylor, reviewing the records of many thousands of tests, since 1915, of men entering the railway service, concludes that 4.7 is the percentage of failures to be regularly expected. For the seven years, 1916-1922, his records show a steadily decreasing percentage (from 8.93 in 1916). In 1922 the percentage failing in both the Stilling and the Williams tests was 4.37; while 0.32 per cent failed with the lantern but passed when taking the Stilling test,



70-Ton Hopper Car Built by the American Car & Foundry Company for the Chesapeake & Ohio



Steel Passenger Coach Built for the Chicago & North Western by the American Car & Foundry Company

## Large Progress In Passenger Car Acquisitions

#### Orders Less Than in 1922, But Otherwise Largest Since 1916; Production Largest Since 1917

RDERS placed in 1923 for passenger train cars for service on the railways of the United States totaled 2.214. This total compares with orders for 2,382 cars in 1922. Except for 1922, it was the largest total for any year since 1916.

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ests, 4.7 the sing ling 0.32 ling Production of passenger train cars for domestic service in the United States totaled 1,507, more than doubling the production figure of 676 for 1922 and making 1923 the largest year from the production standpoint since 1917, in which year 1,924 cars were built.

Taken by-and-large, the passenger car business in 1923 was eminently satisfactory. New business placed on the

	TABLE I. THE PASSENGER CAR ORDERS OF 1923	
For	service in the United States. 2 service in Canada	263
For	export to other countries	6
	Grand total 2	,483

builders' books and production alike were large, even if it is true that no records were broken. Further than that, there is a large holdover business being carried into 1924, representing orders placed during 1923, on which deliveries had not been made up to December 31, 1923.

In 1922 the orders for passenger cars were spread fairly evenly throughout the year. This was not the case in 1923. By far the largest portion of the year's orders was placed prior to April 1. The large holdover of undelivered orders on hand at the end of the year represents those orders placed during the latter part of the year and results in part from the

natural span of time to be expected between the signing of the contracts and the actual completion of the orders. This large holdover is important because it presages a continued high rate of production in 1924 and makes the situation with reference thereto much more certain than is the case with locomotives or freight cars.

Orders in the last three months have been greater than

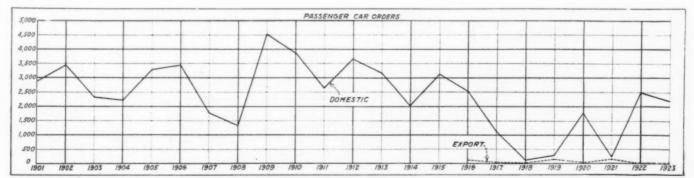
TABLE II. ORDERS FOR PASSENGER CARS SINCE 1901

Year	Passenger cars Year		Passenge: cars
1901	2,879 1909 3,459 1910		. 4,514
1903	2,310 1911		. 2,623
1904			
1906	3,402 1914		. 2,002
19 <b>07</b>	1,791 1915 1,319	• • • • • • • • • • • • • • • • • • • •	. 3,101

#### Domestic and Foreign

Year	Domestic	Canadian	Export	Total
1916	2,544	22	109	2,653
1917	1,124		43	1,167
1918	109		26	157
1919	292	347	143	782
	1,781	275	38	2,094
1921 1922 1923	2,382 2,214	87 263	155 19 6	492 2.488 2,483

they were during the summer months, although not as great as in the spring. Inasmuch as it is expected that 1924 business conditions will be good and railroad net favorable, it may also be expected to follow that there will be continued



Passenger Car Orders, 1901 to 1923

activity as relates to new commitments for passenger train cars on the part of the railroad buyers.

A distinguishing feature about the 1923 passenger car activity was the amount of progress made with respect to the acquirements of new passenger train cars by the railroads. During the period of federal control, acquisitions of new passenger cars were deferred because of the war de-

				Γ/	N. II	L	E	I	I	I.			P	A	S	51	EN	10	ER	(	CA	RS		Bun	T	IN		1923			
																			Un	it	ed	IS	ti	ates			(	Canada	R		Total
Domestic	0 0	 	0 0		0	0 0		0	0 0		0	0	0		0 1	0 0					1,	50									
Foreign .				. 0	0	0.0		0			0	a	0	0	0 1	0 4	. 0					2	19	)							
																					1,	53	6								

Comparison with Previous Years

	Passenger	
Year	Domestic Foreign	Total
1899		2,551
1906* 1907* 1908* 1908* 1910* 1911* 1912†	1,645 71 2,698 151 4,136 276 3,938 308 2,822 238	3,167 5,457 1,716 2,849 4,412 4,246 3,060

	Un	ited State	8	(		Grand	
Year	Domestic	Foreign	Total	Domestic	Foreign	Total	Total
1913	2,559	220	2,779	517		517	3,296
1914	3,310	56	3,366	325		325	3,691
1915	1.852	14	1,866	83		83	1,949
	1,732	70	1,802	37		37	1,839
1917	2 004	31	1,955	45		45	2,000
1918		92	1,572	1		1	1,503
1919	306	85	391	160		160	551
1920	1.272	168	1,440				
1921	1.275	39	1,314	361		361	1,675
1922	676	144	820	71		71	891
1923	1,507	29	1,536				

<sup>\*</sup>Includes Canadian output and equipment built in company shops.

mands and the more pressing need for freight carrying facilities. This situation was continued into 1920 and 1921, in the former year because practically none of the \$300,000,000 revolving fund was allocated for passenger equipment, and in 1921 because of the unfavorable conditions of railway financing. In 1922 the situation was reversed, with the result that large orders were placed. These orders, however, did not result in delivery until 1923.

The data as to additions and retirements are of special interest in this connection. Prior to the war it was the ordinary course of events for the railways to install sometimes as many as 2,500 new passenger cars a year. In 1911 they installed 4,250; in 1914—to take another very good year—3,629; in 1917 they installed 2,535 new cars, and in 1918, 1,817. Installations of new cars in 1919, on the other hand, totaled only 435; in 1920 but 621; in 1921 they rose to 1,681, and in 1922 they totaled 1,199. Complete figures

or installations of new passenger cars in 1923 will not be available for two or three months, when they will be published by the Car Service Division. These figures will not be entirely comparable with the figures reported in the Railway Age, because by the accounting rules, cars that are rebuilt at a cost exceeding 50 per cent of their value must be retired and shown in the accounts as new equipment. The figures of new cars installed, reproduced above, and those from the Car Service Division, therefore include a considerable amount of rebuilt equipment which does not appear in the Railway Age totals.

At any rate, the interesting feature is that for the first three-quarters of 1923 the Car Service Division reports new passenger cars installed amounting to 1,858, which it will be noticed, is as large as any figure for an entire 12 months as far back as 1917, when the installations totaled 2,535 cars.

This large addition to the passenger train cars of the country represents substantial progress. It does not mean that the amount of passenger train equipment available for use has increased substantially in quantity. It means rather the replacement of old equipment, and more particularly the substitution of steel for wooden equipment. The number of passenger cars in service, for example, at the end of 1918 was 53,941; at the end of 1922 the total was 54,354. The A. R. A. Car Service Division report as of September 30 gave a total of 54,349. As compared with installations of new cars in the first three-quarters of 1923 of 1,858, there were retirements totaling 1,765, which explains the relatively small increase in new equipment even with the large numbers of new cars installed.

Another interesting feature in connection with the passenger car situation is shown in the report recently issued by the Bureau of Railway Economics concerning the sum spent for additions and betterments during the year 1923. The tabulation shows a total additions and betterments expenditure for passenger cars of approximately \$50,000,000 for the entire year. It is of particular interest that only one-half of this total sum was expended in the first three-quarters of the year and that the other half is reported as having occurred in the last quarter. The report also shows that there will be carried over into 1924 \$15,000,000, representing sums set aside for the purchase of passenger equipment, deliveries of which have not yet been made.

As in 1922, an important feature of the 1923 passenger car orders was the large purchases of gasoline rail motor cars. In the tabulations which follow there are shown a total of 76 cars, and perusal of the list will give one an opportunity to observe which roads have decided to give this kind of equipment a trial. It is believed that the list of such cars. In the tabulations which follow there are shown a found. The gasoline motor car orders are not included in the totals of passenger train cars given in the table.

#### Passenger Car Orders in 1923 For Service in the United States

Purchaser	No.	Class	Length	Construction	Seating capacity	Weight	Wheels per truck	Lighting	Builder
Alabama & Vicksburg	5	Coaches	*****	*****					Am. Car & Fdy.
	2	Pass. & Bagg.					2.0		Am. Car & Fdy.
	1	Baggage					9.9		Am. Car & Fdy.
	1			*****					Am. Car & Fdy.
Arms-Yager Ry. Car Co	50	Baggage	60 ft. 0 in.	St. Und'frame			4		Pullman
Atchison, Topeka & Santa Fe	3	Business	73 ft. 6 in.	All Steel	4.0	175,000	6	Electric	Pullman
4	50	Exp. Refr.	56 ft. 56 in.	All Steel		*****	4		General American
	25	Baggage	72 ft. 1034 in.	All Steel	0.0	125,000	6	Electric	Pullman
	4	Business	59 ft. 81/4 in.	All Steel			4	Electric	Pullman
Atlantic Coast Line	25	Coach	82 ft. 2 in.	All Steel	88	149,000	6	Electric	Standard Steel
THIS COURT DING THE THINK	15	Express	73 ft. 7 in.	All Steel	• •	133,500	6	Electric	Standard Steel
	5	Mail & Bagg.	73 ft, 7 in.	All Steel		133,000	6	Electric	Standard Steel
	2	Mail	64 ft, 2 in,	All Steel		120,000	6	Electric	Standard Steel
	5	Dining	78 ft. 9 in.	All Steel	48	155,900	6	Electric	Pullman
Baltimore & Ohio	4	Dining	******	All Steel	48 36	100,200	6	Electric	Pullman
panimore a Calo	50	Coaches		******					Pullman
	5	Dining			**	*****		******	Pullman
Bangor & Aroostook	9	Bagg. & Mail	65 ft, 9 in.	St. Und'frame		110,000	4	Electric	
Bangor & Arcostook	8	Dagg. or Mail	00 st. 7 sss.	Or Ond Hame	0.0	110,000	4	Electric	Company Shops

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<b>J</b>					Seating		Wheels		
Purchaser	No		. Length	Construction	Seating capacity	Weight	per truck	Lighting	Builder Pfaudler Co.
Buffalo, Rochester & Pitts	6 3	Gl. lined Tank Bagg. & Exp. Mail & Bagg.	69 ft. 3½ in. 69 ft. 3½ in.	All Steel	••	125,700 126,350	6	Electric Electric Electric	Am. Car & Fdy. Am. Car & Fdy. Am. Car & Fdy.
Central of Georgia	7 2 2 2	Coaches Coaches Part. Coach Express	74 ft. 10½ in. 79 ft. 0 in. 79 ft. 0 in. 74 ft. 0 in.	All Steel All Steel All Steel All Steel	80 82 78	138,400 137,500 140,000 131,500	6 6 6	Electric Electric Electric	Pullman Pullman Pullman
Central of N. J	50 5 10	Coaches Pass. & Bagg. Baggage	72 ft. 5½ in. 72 ft. 5½ in. 74 ft. 5¾ in.	All Steel All Steel All Steel All Steel	78 50	117,500 117,000 142,500 149,800	4 4 6	Electric Electric Electric Electric	Standard Steel Pressed Steel Am. Car & Fdy. Am. Car & Fdy.
Central Vermont	8 2 2	Bagg. & Mail Coaches Baggage Stor. batt.	74 ft. 4¼ in.	All Steel	50	60,000		Electric	G. T. Shops G. T. Shops Ry. Stor. Batt. Car
Chesapeake & Ohio	6 2 6 4	Mail & Exp. Observation Parlor Coach	72 ft. 9 in.	All Steel	••	• • • • • • • • • • • • • • • • • • • •	6	Electric	Pullman Pullman Pullman Pullman
	2 2 2	Dining Pass. & Bagg. Mail		*****	**	*****		Electric	Pullman Pullman Pullman Pullman
Chicago & Eastern Illinois Chicago & North Western Clev., Cinn., Chic., & St. L	200 6 3	Dining Milk Coaches Dining	70 ft. 0 in. 70 ft. 0 in. 72 ft. 6 in.	All Steel St. Und'frame All Steel All Steel	36 85 36	140,000 165,600	6 4 6	Electric Electric	Pullman Am. Car & Fdy. N. Y. C. Shops
Copper River & Northwestern	1	Business Private Car	85 ft. 534 in.	All Steel	* *	179,000 170,000	6	Electric Electric	Pullman Pullman Standard Steel
Crane, Mr. Delaware, Lackawanna & Western Erie Florida East Coast	10 44 15	Milk Sub-coaches	41 ft. 13% in. 72 ft. 734 in. 70 ft. 0 in.	St. Und'frame All Steel All Steel	86	88,750	4	Electric Electric	Pressed Steel Pullman
Florida East Coast	2	Baggage Mail Dining	60 ft. 0 in. 73 ft. 6 in.	All Steel		*****	6	Electric Electric	Pullman Pullman Company Shops
Georgia	2 4 2 2	Mail & Bagg. Coaches Coaches Baggage	64 ft. 11¾ in. 76 ft. 2¾ in. 76 ft. 2¾ in. 70 ft. 9¾ in. 70 ft. 9¾ in.	St. Und'frame All Steel All Steel All Steel	80 76	119,900 114,300 114,300 110,000	4 4 4	Electric Electric Electric Electric	Am. Car & Fdy. Am. Car & Fdy. Am. Car & Fdy.
Hudson & Manhattan	25	Bagg. & Mail Subway	70 ft. 9¾ in. 51 ft. 0 in. 79 ft. 0 in.	All Steel All Steel All Steel	44 36	115,000 74,000 154,000	4 4 6	Electric Electric Electric	Am. Car & Fdy. Am. Car & Fdy. Pullman
Illinois Central	4 2 5	Parlor Café Lounge Dining	79 ft. 0 in. 79 ft. 0 in. 79 ft. 0 in.	All Steel All Steel	40 36	156,000 156,300	6	Electric Electric	Pullman Pullman
	25 8	Suburban Baggage	72 ft. 7½ in. 73 ft. 6 in.	All Steel	84	91,000 128,300	6	Electric Electric Electric	Pullman Standard Steel Standard Steel
Inter. Public Service	3	Horse Buf. Par.	73 ft. 6 in.	All Steel	**	128,000		Electric	Am. Car & Fdy. Am. Car & Fdy.
Interstate Pub. Serv. Co	3 2 25	Sleeping Parlor Buff. Milk	*****	*****			• •		Am. Car & Fdy. Am. Car & Fdy.
Lehigh Valley Long Island Louisville & Nashville	60 14 6	Motor Coach Baggage Bagg. & Mail Bagg. & Mail	64 ft. 4¾ in. 72 ft. 8¾ in. 72 ft. 8¾ in. 72 ft. 8¾ in. 77 ft. 9¾ in. 77 ft. 9¾ in. 68 ft. 11¾ in.	All Steel All Steel All Steel All Steel	78	115,000 132,200 138,600 136,600	4 6 6	Electric Electric Electric Electric	Am. Car & Fdy. Pressed Steel Pressed Steel Pressed Steel
	10 5 5 5	Coaches Compt. Coaches Coaches Compt. Coaches	68 ft. 1134 in.	All Steel All Steel All Steel All Steel All Steel All Steel	82 80 76 72 36	144,500 144,800 119,000 119,300 162,700	6 4 4 6	Electric Electric Electric Electric Electric	Am, Car & Fdy. Am, Car & Fdy. Am, Car & Fdy. Am, Car & Fdy. Am, Car & Fdy.
Louisville, Henderson & St. Louis	2 2 3	Dining Coaches Coaches Bagg. & Mail	81 ft. 8 in.	All Steel All Steel All Steel	• •	*****	• •	******	Am. Car & Fdy. Am. Car & Fdy. Am. Car & Fdy. N. Y. C. Shops
Michigan Central	8	Dining Bagg. & Mail	80 ft. 5 in. 64 ft. 1 in.	All Steel All Steel All Steel	36 84	211,000 113,800 100,000	6 4 4	Electric Electric Electric	Standard Steel Am. Car & Fdy.
Missouri Pacific	13 18	Sub-coaches Coaches	68 ft. 1034 in	All Steel	117	110,000 137,300	4	Electric Electric	Am. Car & Fdy. Am. Car & Fdy.
	12	Chair	76 ft. 11 in. 70 ft. 0 in.	All Steel	68	132,000 126,700	6	Electric Electric	Am. Car & Fdy. Am. Car & Fdy.
	9	Compt. Coaches Dining	76 ft. 11 in. 78 ft. 10 in.	All Steel	80 36 58	137,300 160,000	6	Electric Electric Electric	Pullman Pullman Pullman
Mobile & Ohio	2	Café-Club Coaches	76 ft.11 in. 75 ft. 11 in. 64 ft. 0 in.	All Steel All Steel All Steel	82	150,000 135,500 108,600	6	Electric Electric	Pullman Pullman
v v 01	1	Coaches Bagg, & Exp. Mail & Bagg, Bagg, & Mail	64 ft. 0 in.	All Steel	::	111,600 136,000	6	Electric Electric	Am. Car & Fdy. Osgood-Bradley
N. Y. Central	10 75	Baggage Milk	63 ft. 334 in. 52 ft. 354 in. 63 ft. 334 in.	All Steel St. Und'frame All Steel		111,000 82,000 111,000	4 4	Electric	Am. Car & Fdy. M. D. T. Co. Company Shops
	10	Baggage Dynamometer Dynamometer	55 ft. 0 in. 53 ft. 6 in.	All Steel All Steel	• •	126,000 120,000	4	Electric Electric	Company Shops Company Shops Burr Co.
New York, Chicago & St. Louis.	50	Business	83 ft. 534 in. 42 ft. 0 in.	All Steel	**	179,000	6	Electric	Pullman Standard Steel
Pacific Electric Pacific Fruit Express	200 100	Exp. Refr. Exp. Refr.	49 ft. 01/8 in. 49 ft. 01/8 in.	St. Und'frame St. Und'frame	::	82,800 82,800		Electric	Am. Car & Fdy. General American Company Shops
Peoria & Eastern	4	Postal Mail & Bagg.	61 ft. 3 in. 70 ft. 0 in. 72 ft 41/4 in	All Steel All Steel All Steel	84	125,000	4	Electric Electric	Company Shops Standard Steel Bethlehem Ship Bethlehem Ship
Philadelphia & Reading	40 10 18	Pass. & Bagg.	72 ft. 4½ in. 72 ft. 4½ in. 77 ft. 9¾ in.	All Steel	56 85	109,000 134.000	4	Electric Electric	Bethlehem Ship Am. Car & Fdy. Osgood-Bradley
Pullman Company	18 50	Coaches	77 ft. 934 in. 83 ft. 534 in.	All Steel	85 27	134,000	6	Electric Electric	Osgood-Bradley Pullman Pullman
runman Company	10 15	Obser. Sleep.	83 ft. 534 in. 83 ft. 534 in. 83 ft. 534 in.	All Steel All Steel All Steel	21 32 27	*****	6	Electric Electric Electric	Pullman Pullman
	15 10 70	Compt. Obser.	83 ft. 534 in.	All Steel All Steel	22	*****	6	Electric Electric	Pullman Pullman
	100	Sleeping	*****	All Steel	28		6	Electric Electric	Pullman Pullman
	71	Sleeping Dining	83 ft. 5¾ in.	All Steel	27		6	Electric Electric Electric	Pullman Pullman Pullman
Rutland	20 10	Milk	52 ft. 6 in. 72 ft. 6 in.	All Steel St. Und'frame	30 26	145,000	6	Electric	M. D. T. Co. Am. Car & Fdy.
Rutland San Diego & Arizona Seaboard Air Line	4		70 ft. 9 in.	All Steel All Steel All Steel			6	Electric Electric	Pressed Steel Am. Car & Fdy. Pullman
	2	Dining Business	81 ft. 23/2 in. 82 ft. 93/4 in.	All Steel	**	179,000	6 6	Electric Electric	Pullman
Southern Pacific	60 10	Interurban Dining	72 ft. 0 in. 72 ft. 0 in.	All Steel	••		• •	******	Pullman Pullman Standard Steel
	40	Coaches	70 ft. 0 in. 60 ft. 0 in. 72 ft. 0 in.	All Steel All Steel All Steel	• •		**	******	Am. Car & Fdy. Am. Car & Fdy.
	15 5 15	Chair	60 ft. 0 in. 70 ft. 0 in.	All Steel All Steel	::				Am. Car & Fdy. Am. Car & Fdy. Am. Car & Fdy.
Southern Railway	16	Bagg. & Buff.	75 ft. 0 in.	All Steel	36	155,000	·6	Electric	Pullman
Ulster & Delaware	1	Milk	78 ft. 9 in. 39 ft. 5 in.	St. Und'frame	• •	*****	4	******	Company Shops

			****	ILWAI AGE					voi. 70, 140. 1
Purchaser Union Pacific  Utah Copper Co Wabash Western Pacific	No. 18 10 11 10 10 4 1 20 8 20	Class Observation Bagg. & Mail Bagg. & Mail Dining Horse-Bagg. Pass. Private Coaches Dining Baggage	Length 75 ft. 5 in. 69 ft. 0 in. 69 ft. 0 in. 83 ft. 0 in. 74 ft. 2 in. 78 ft. 6½ in. 79 ft. 6 in. 60 ft. 1½ in.	Construction All Steel All Steel All Steel All Steel All Steel All Steel Frame All Steel All Steel All Steel All Steel All Steel All Steel	Seating capacity 41 36 84 36	Weight 145,500 124,500 124,500 158,000 126,000	Wheels per truck 6 6 6 6 6 6 6 4	Lighting Electric Electric Electric Electric Electric Electric Electric Electric	Builder Pullman Standard Steel Standard Steel Pullman Am. Car & Fdy. Magor Am. Car & Fdy. Pullman Pullman Pressed Steel
Canadian National	20 10 30 50 35 6 10 6 12	Baggage Baggage Sleeping Exp. Refr. Coaches Coaches Mail & Exp. Stor. Bat. Bagg. & Mail	77 ft. 6 in. 77 ft. 6 in. 84 ft. 4½ in. 45 ft. 0 in. 82 ft. 4½ in. 82 ft. 4½ in. 77 ft. 6 in. 79 ft. 1 in. 75 ft. 6 in.	Canada St. Und'frame St. Und'frame Steel Frame St. Und'frame Steel Frame Steel Frame Steel Frame All Steel Steel Steel	62 83 84 50	138,400 140,500 168,500 80,300 153,500	6 6 4 6 6 6 4 6	Electric Electric Electric Electric Gas Electric Gas Electric	Can, Car & Fdy. Nat. Steel Car Can, Car & Fdy. Natl, Steel Car Can, Car & Fdy. Can, Car, & Fdy. Can, C. & F. & Co, Shops Co, Shops
Sydney & Louisburg Tor., Ham. & Buffalo	6 15 10 10 6 10 6	Parlor Buffet Baggage Coach Frames Work Coaches Baggage Coaches Smoking	78 ft. 0½ in. 75 ft. 6 in. 83 ft. 4½ in. 69 ft. 7¼ in. 61 ft. 3 in. 73 ft. 6 in. 63 ft. 6 in.	Steel All Steel St. Und frame Steel Steel Steel Steel	90	150,000	6	Electric  Gas  Oil  Electric  Electric  Electric  Electric	Co., Shops Can, C. & F. & Co. Shops Can, C. & F. & Co. Shops National Steel Nat'l Steel Car Eastern Car Can, Car & Fdy, Can, Car & Fdy, Can, Car & Fdy,
Argentine State Rys National Rys. of Mexico	1 5	Dynamometer Coaches	51 ft. 2 in.	Export St. Und'frame All Steel	54	58,220	4 4	Electric Gas & Oil	Burr Co. Pullman
		Order	rs for Ga	soline Rail-	Motor	Cars			
Abilene & Southern Atlantic & Western Baltimore & Ohio Balt., Chesapeake & Atlantic. Birmingham & Southeastern.  Black Star Coal Co.  Cambria & Indiana Cape Fear Chicago, Burlington & Quincy. Chicago Great Western  Cleve., Cinn., Chic. & St. L  Delaware & Hudson Erie  Fairchild & N. Eastern  Fonda, Johnstown & Gloversville Ft. Smith Sub. & Rock Island. Franklin & Pittsylvania Graysonia, Nashville & Ashdown. Great Northern Gulf, Mobile & Northern Gulf, Texas & Western. Jefferson Southwestern Laurinburg & Southern  Lehigh & New England Lehigh Valley Maxton, Alma & Southbound. Minnesota, Dakota & Western Mississippi Central  Mt. Jewett, Kinzua & Riterville. N. Y., N. H. & Hartford.	111114333111112121111111111111	Motor Coach Motor Car Motor P. & B. Motor Trailer Motor Cars Motor Cars Motor Cars Motor Cars Motor Cars Motor Coach Trailer Motor Coach Motor Coach Motor Coach Motor Coach Motor Coach Motor Cars Motor Cars Motor Car Trailer Motor Car Motor Car Motor Car Motor Car Trailer Motor Car Motor Coach	44 ft. 0 in. 35 ft. 0 in. 36 ft. 0 in. 30 ft. 0 in. 30 ft. 0 in. 32 ft. 0 in. 32 ft. 0 in. 32 ft. 0 in. 32 ft. 0 in. 37 ft. 0 in. 38 ft. 10 in. 38 ft. 10 in. 39 ft. 4 in. 39 ft. 4 in. 55 ft. 0 in. 42 ft. 6 in. 42 ft. 6 in. 43 ft. 5½ in. 30 ft. 0 in. 52 ft. 0 in. 52 ft. 0 in. 52 ft. 0 in. 53 ft. 0 in. 52 ft. 0 in. 53 ft. 0 in. 52 ft. 0 in. 53 ft. 0 in. 55 ft. 0 in. 56 ft. 0 in. 57 ft. 8 in. 57 ft. 8 in.	Composite All Steel Composite Steel Frame Steel Frame Steel Frame Steel Frame Steel Frame All Steel Composite Composite Composite All Steel Composite Composite Steel Frame Composite Composite Composite Steel Frame Composite Steel Frame Composite Composite Steel Frame Composite Steel Frame All Steel Composite Steel Frame All Steel St. Und'frame All Steel All Steel St. Und'frame All Steel All Steel	440 440 253 388 253 360 300 373 340 440 444 360 440 446 446 446 446 446 446 4	29,000 20,000 18,000 18,000 18,000 20,000 20,000 20,000 29,880 19,000 21,000 69,800	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Electric	J. G. Brill Co. Edwards Edwards J. G. Brill Co. Edwards Edwards Edwards Edwards Edwards Edwards Edwards Edwards Sykes Company Sykes Company Sykes Company Geen Mot. Car Electromot. Engr. J. G. Brill Co. J. G. Brill Co. F. G. Brill Co. F. G. Brill Co. F. G. Brill Co. F. G. Brill Co. J. G
Nevada-California-Oregon Pennsylvania R. R  Philadelphia & Reading St. Louis, Kennett & So'eastern. San Antenio & Aransas Pass	1 1 1	Motor Motor Motor Motor Motor P. & B. Motor Trailer Steam	32 ft. 0 in. 42 ft. 7 in. 30 ft. 0 in. 70 ft. 0 in. 23 ft. 11 in.	Composite All Steel	22 39 45 43 46 25 36 60 26	15,500 26,000 26,000 26,000 26,000 18,000 18,000 84,400 21,100	4 & 2 4 4 4 4 4 & 4 4 4 & 4 4 & 4 4 & 4	Electric Electric Electric Electric Electric Electric Electric Electric	bury Tool A. Meister Sons J. G. Brill Co. Edwards McKeen-Unit. Ry. Car F. W. D. Auto Co.
Sewell Valley  Stewartstown Sumpter & Choctaw Susquehanna & New York Tennessee, Alabama & Georgia. Tenn., Ky. & Northern Tuckaseegee & South Eastern Unadilla Valley Virginia & Carolina Southern Washington & Lincolnton Willamette Valley & Coast	1 1 2	Motor P. & B. Motor Bagg. Motor Car Motor Car Motor P. & B. Motor P. & B. Motor Car	30 ft. 0 in. 60 ft. 0 in. 42 ft. 7 in. 32 ft. 0 in. 30 ft. 0 in. 30 ft. 0 in. 30 ft. 0 in.	Composite All Steel Steel Frame All Steel All Steel Composite All Steel All Steel All Steel All Steel	42 30 45 30 36 46 32 22 25	18.000 42,000 30,000 20,000 17,000 17,000	4 & 4 4 & 4	Electric Electric Electric Electric Electric Electric Electric Electric Electric	J. G. Brill Co. J. G. Brill Co. J. G. Brill Co. Edwards A. Meister Sons J. G. Brill Co. Edwards J. G. Brill Co. Edwards J. G. Brill Co. Edwards Edwards Edwards Edwards Edwards
Canadian National	1 2 1	Motor Car Motor P. & B.	54 ft. 1½ in. 37 ft. 6 in.	Canada All Steel All Steel	50 32	66,000 24,920		Electric Electric	National Steel Ledoux, Jennings
	2 3 5 12	Motor Cars Motor Cars N. G. Coaches Motor Cars	54 ft. 3 in.	All Steel Composite	46  46	36,000	::	Electric Electric	Wason Int'l Motor Pullman J. G. Brill Co.

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40-Ton Refrigerator Car with Outside Steel Frame Built for the Philadelphia & Reading by the American Car & Foundry Company

### Freight Car Increase Breaks All Records

# Railroads Devoted 39 Per Cent of All 1923 Capital Expenditures to Freight Cars—Good Promise for 1924

THE freight cars ordered during 1923 for service in the United States totaled, according to compilations by the Railway Age, 94,471. This compared with 180,154 ordered in 1922. The 1922 total represented the largest number of cars ordered in any year since 1906 with two exceptions, 1909 and 1912. Even though the 1923 total was approximately one-half that of 1922, it was nevertheless the largest total reported for any year since 1916—1918 and 1922

The Canadian orders of cars placed either with United States or Canadian builders for service in Canada totaled 8,685, comparing with only 746 in 1922 or with 12,406 in

Export orders in 1923 were conspicuous by their absence.

		TABLE I	-FREIGHT	CAR	ORI	DERS	01	1	92	3				
For	service in	the United	States									 		94,471
For	service in	Canada											0.0	8,685
ror	export to	cther coun	tries						0 0		0 0	 		396
	Grand	total	******									 		103,552

The Railway Age tabulations show export business amounting to only 396 cars, a total so low as to make it evident that the United States has found itself unable to retain the freight car export business which it received as a result of the war. An adverse effect on export business has been the decreased buying power of the rest of the world outside of the United States but even that factor cannot go very far towards explaining such a small total of orders as is reported here for the 1923 export business. The situation is disappointing, but, in view of the trend of export trade conditions for the past year or two, not entirely unexpected.

The remarkable feature of 1923 from the freight car standpoint was the production. The *Railway Age* compilation for freight car production for domestic service shows a total of 175,748 cars. This compares with a production of only 66,289 in 1922. It is the largest total reported for any year back to 1907—in which year 280,216 cars were built—with the single exception of 1913 when production totaled 176,049 or only 301 more than in 1923. Table III shows a figure for 1910 of 176,374 cars but in 1910 Canadian production was included, whereas this is not the case with the 1923 figures.

The freight car market at the present time evidences decidedly optimistic tendencies which speak well for a large

	Domes	tic Orders		
	Freight	0		Freight
Year	cars	Year		cars
1901	193,439	1908		62,669
1902				
1903		1910		141,024
1904				
1905				
1906		1913		146,732
1907	151,711	1914		80,264
	Demestic	and Foreign	1	
Year	Domestic	Canadian	Export	Total
1915	109,792	*****	18,222	128,014
1916	170,054		35,314	205,368
1917	79,367		53,191	132,558
1918	114,113	9,657	53,547	177,317
1919	22,062	3,837	3,994	29,893
1920	84,207	12,406	9,056	105,669
1921	23,346	30	4,982	28,358
1022	180,154	746	1.072	181,972
1922	94,471	8,685	396	105,552

volume of orders and production alike for 1924. The large part of the 1923 business was placed in the early months of the year. The Railway Age weekly records show that over two-thirds of the year's business was placed prior to April 30, and that inquiries and orders were few and far between from that date until December. However, sizable orders were placed in December and several important orders are pending as we enter the new year. It is of particular

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importance that the volume of business reported for December was the largest for any month in 1923 with the single exception of March. It is true that the builders do not go into 1924 with large orders on their books. The latest figures of the Car Service Division show cars on order as of December 1 of 36,789. The railroads have been installing cars lately at the rate of about 20,000 cars monthly. This would mean that on the basis of the December 1 situation there was enough business on hand to call for building activity only about to the middle or end of January. However, the heavy orders in December and the present volume of inquiries indicate a bettering of the situation that should be continued into 1924.

In the article dealing with locomotive orders and production in 1923, the point was made that one of the most important factors assisting the railroads to secure their remarkable record of operating efficiency in 1923 was the improved situation as to motive power. It would, of course, follow that great assistance must also have been obtained from the railroads' heavy acquisitions of new freight cars, although it would still remain that however many new cars may have been obtained, they could not be moved properly without adequate motive power. The railroad expenditures for additions and betterments in 1922 totaled \$440,000,000. In 1923 they reached a total of \$1,075,897,940. It is not generally realized that the largest single item in the list of capital expenditures for both years alike was for freight cars. The following tabulation, prepared by the Bureau of Railway Economics, shows this fact clearly:

Locomotives	Capital expendi- tures in 1922 45,000,000 200,000,000	Estimated total capital expendi- tures for 1923 212,225,204 { 415,923,534 49,791,516	Estimated carry-over into 1924 20,665,383 50,006,942 14,793,182	
ing equipment		12,917,012	4,362,598	
Total equipment	245,000,000	690,857,266	89,828,105	
Total roadway and struc- tures	195,000,000	385,040,674	210,978,414	
Grand total	440,000,000	1,075,897,940	300,806.519	

One thing that will not pass unnoticed is the comparatively small carry-over into 1924 in the case of locomotives and freight cars. This checks up the point made in a preceding paragraph to the effect that the builders do not start 1924 with large orders on their books. The carry-over in the case of passenger cars is proportionately much larger. The passenger car builders have fairly large orders on their books at present, a factor resulting presumably from the longer time required to complete the construction of passenger train equipment. The comparatively large carry-over of the roadway and structures expenditures results from a similar situation.

The feature of the table, however, to which we must pay

the greatest attention here is the relative proportion of expenditures for equipment and those for roadway and structures. In 1922, of the total of \$440,000,000 expended for capital improvement, \$245,000,000 was for equipment. It has been generally considered an axiom that proper railway development calls for an expenditure of \$3 for way and structures to each \$1 for equipment, the idea being that this ratio is necessary so that there will thereby exist adequate

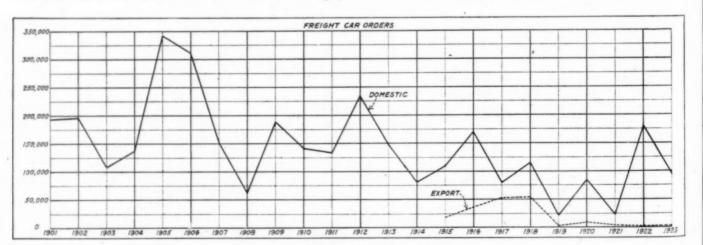
Domestic Foreign		Canada	Total
	178,166		
Year Comparison with Domes			Total
1899	70 2,5		119,886 115,631
1901	47 2,8		136,950 162,599 152,801
1904	01 5,3	05	60,806 165,155
1906*	16 9,4 14 1,2	29	240,503 284,188 76,555
1909*	77 2,4 74 4,5	71	93,570 180,945
1911*			72,161 152,429

\*Includes Canadian output.
†Includes Canadian output and equipment built in company shops.

	U	nited Sta		(	C 1		
	Domestic	Foreign	Total	Demestic	Foreign	Total	Gran
913	176,049	9,618	185,667	22,017		22,017	207.68
914	97,626	462	98,088	6,453		6,453	104,45
915	58,226	11,916	70,142	1,758	2,212	3,970	74.1
16	111,516	17,905	129,421			5,580	135,0
17	115,705	23,938	139,643	3,658	8,100	11,758	151,40
118	67,063	40,981	108,044	14,704	1.960	16,664	124.7
19		61,783	156,764	6,391	30	6,421	163,18
20	60,955	14,480	75,435				
21	40,292	6,412	46,704	8,404	745	9,149	55,83
22	66,289	1,126	67,415	458	100	558	67,97
23	175,748	2,418	178,166				

yards and terminals, a roadway of proper character and sufficient roundhouses and repair shops to take care of the traffic transported by the equipment, or to care for the equipment itself, as the case might be. There are many reasons why the desired ratio of 3 to 1 has not been secured, particularly in recent years. The principal reason is that all railway development has been deferred.

The railways are now catching up on their requirements and the efficacy of financing through equipment trust certificates has enabled them to meet their equipment requirements first. Entirely adequate remedy for the unduly small ratio of way and structures expenditures which has actually existed will not be offered, however, until the time comes that



Freight Car Orders, 1901 to 1923

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the railways will have better success in financing their needs with other sorts of indebtedness than the equipment trust, or better yet with capital stock. The point is that in 1922 the situation was such that instead of a ratio of \$3 expended for way and structures to each dollar expended for equipment, the ratio was reversed to the extent that of the total capital expenditures for the year no less than 56 per cent was for equipment. The ratio for 1923 was 64 per cent. Of the total expenditures for equipment in 1923, 60 per cent was for freight cars. The freight car expenditures constituted 39 per cent of the total of all.

The number of freight cars installed by the railways as reported monthly by the Car Service Division of the American Railway Association. The number of installations will not agree with the figure of freight cars built shown in this article. For one thing, the Car Service Division reports cover only the Class I roads, whereas the Railway Age figure of cars built covers all roads, private car lines and all other domestic purchasers. For another, the Car Service Division totals include rebuilt cars on which the amount spent for repairs has been sufficient so that under the accounting rules the equipment so rebuilt must be retired and entered on the equipment register as new. The latest Car Service Division total is that for the first 11 months of 1923 and it shows installations for 1923 to December of 177,845 cars.

The Bureau of Railway Economics has recently prepared a tabulation of statistics of Class I railroads covering the years 1911 to 1922. This shows the freight car ownership and figures for installations and retirements for each year of the period named. It is not possible at this time to determine exactly how closely the Car Service Division total of installations will agree with those of the Interstate Commerce Commission which the Bureau quotes, but the two figures will probably not be far apart. The Car Service Division figure for 11 months of 1923 shows installations totaling, as above mentioned, 177,845 cars. In no year in the Bureau's tabulation is there a figure which approaches this amount. The installations for the year 1922 totaled only 101,481; for 1921 only 63,406 and for 1920 only 36,044. In each of these years, incidentally, the number of retirements exceeded the number of installations so that whereas the railroads owned 2,389,860 cars at the end of 1919, at the end of 1922 they owned only 2,322,279, or about 78,000 cars less-equivalent to the freight car production of a fairly busy year in the builders' shops. Further than that, the total carrying capacity also was less. At the end of 1919 the aggregate capacity of the freight carrying cars on the railways of this country totaled 99,001,041 tons; at the end of 1922 but 98,847,236 tons. Referring again to the comparison with other years, it should be noted that the installations of new cars for the years 1918 to 1922 were subnormal. Nevertheless, in no year in the tabulation did the annual installations of freight cars match the 11 months' total of 177,845 reported in 1923. The largest figure shown for any year in the table is 1913, the installations for which year totaled 162,670 cars or roughly 15,000 less than in the first 11 months of 1923.

Progress in freight car supply is also indicated in analysis of the repair situation which deserves passing mention. On January 1, 1923, the railways had 216,011, or 9.5 per cent, of their cars in bad order. On December 1, the total of cars in bad order was 155,626, or 6.8 per cent. This, from the standpoint of available car supply, really adds another 60,000 cars and as such was further assistance in preventing a car shortage during 1923.

The list of orders which follows is compiled from information furnished to the Railway Age by the railroads and private car lines in response to requests for this information. The data thus furnished was then checked against lists of orders furnished by the car builders and against the weekly reports which have appeared in the weekly equipment and supplies columns of the Railway Age. A special effort was made to guard against the inclusion this year of items which may have been included in the 1922 tables, a factor of special difficulty because so much business was placed in the last week or two of December, 1922, after the responses to the Railway Age inquiries for that year had been sent in. Many roads included such December, 1922, orders as 1923 business but inasmuch as they are included in our 1922 totals, they will not be found in the tables which follow. The figures of production were secured in response to requests made to the car builders for this information. As in former years, the Railway Age is especially indebted to the Railway Car Manufacturers' Association in securing the reports of the members of that organization.

The following statement quoted from the Railway Age of January 6, 1923, holds as true now as it did then: "The Railway Age is not sufficiently optimistic as to believe that the lists can include all of the orders placed or that the production is of scientific accuracy, but it is believed that such omissions as occur will be found to be small and unimportant and will not vitiate the value of the figures, particularly as concerns comparisons with preceding years which, after all, is the primary purpose of the compilations."

#### Freight Car Orders in 1923

#### For Service in the United States

			T. O. D.	civice mi the	Omited State	20			
Purchaser	No.	Class	Capacity	Length	Construction	Weight	Draft Gear	Trucks	Builder
Alabama & Vicksburg	100 200 100	Gondola Box Flat	100,000 80,000 100,000	40 ft. 6 in. 41 ft. 4½ in.	St. Und'frame Steel Frame St. Und'frame		Friction	Arch Bar Arch Bar	Am. Car & Fdy. Chickasaw Chickasaw
Aliquippa & Southern Allen & Nelson Mill	22	Flat Logging	240,000 80,000	46 ft. 0 in.	Steel Frame Composite	72,000	Spring	St. Side Fr.	Fones & Laughlin Pac. Car & Fdy.
Aloha Lumber Co	1	Log. Flat Logging Logging	70,000 70,000 200,000		Composite Wood All Steel	•••••	• • • • • • •		Pac. Car & Fdy. Pac. Car & Fdy. Pac. Car & Fdy.
American Tar Products Co	10 10	Tank Tank	8,000g. 10,000g.	36 ft. 0 in. 36 ft. 0 in.	All Steel	46,000 57,000	Friction Friction	St. Side Fr. St. Side Fr.	Standard Tank Standard Tank
Ana Arbor	24 250 250	S. S. Box S. S. Auto	120,000 80,000 80,000	30 ft. 1 in. 40 ft. 6 in. 40 ft. 6 in.	All Steel Steel Frame Steel Frame	54,770 42,000 42,000	Friction Friction	Arch Bar Arch Bar	Pressed Steel Standard Tank Standard Tank
Atchison, Topeka & Santa Fe.	200 300	Flat Gondola	100,000 100,000	50 ft. 0 in. 48 ft. 6 in.	St. Und'frame Steel Frame	39,500	Friction Friction	St. Side Fr. Arch Bar	Pullman Pullman
Atlanta & West Point	150	Hopper Flat	110,000 80,000	30 ft. 6 in. 40 ft. 0 in.	All Steel Wood	40,500 33,800	Spring Spring	St. Side Fr. Arch Bar	Am. Car & Fdy. Company Shops
Western Ry, of Ala	50 4 50	Box Box Box	60,000 60,000	36 ft. 0 in. 36 ft. 0 in. 36 ft. 0 in.	Wood Wood	38,800 38,500 38,800	Spring Friction Spring	St. Side Fr. St. Side Fr. Arch Bar	Company Shops Company Shops Company Shops
Atlantic Coast Line	15 450 250 250	Coal L. S. Gondola D. S. Box D. S. Box	80,000 100,000 80,000 80,000	34 ft. 8 in. 41 ft. 6 in. 36 ft. 0 in. 36 ft. 0 in.	Wood St. Und'frame Steel Frame Steel Frame	38,500 42,200 46,500	Spring Friction Friction	Arch Bar St. Side Fr. St. Side Fr. St. Side Fr.	Company Shops Va. Bridge & Iron Company Shops
B. & B. Logging Co	1	Logging Logging	120,000 80,000	*********	All Steel Composite	46,500	Spring	St. Side Fr.	Company Shops Pac. Car & Fdy. Pac. Car & Fdy.
Balfour, Williamson & Co	1	Tank Tank	6,105g. 10,136g.	27 ft. 0 in. 28 ft. 0 in.	All Steel		Friction Friction	Arch Bar Arch Bar	Am. Car & Fdy. Am. Car & Fdy.
Baltimore & Ohio	1,000 1,000 500 500	D. S. Box D. S. Box D. S. Box Hopper	80,000 80,000 80,000 110,000	42 ft. 6 in. 42 ft. 6 in. 42 ft. 6 in. 30 ft. 101/2 in.	Steel Frame Steel Frame Steel Frame All Steel	43,600 43,600 43,600 40,100	Friction Friction Friction Friction	St. Side Fr. St. Side Fr. St. Side Fr. St. Side Fr.	Ill. Car & Mfg. Standard Steel Am. Car & Fdy. Pressed Steel
	1,000	Hop. Box Gondola	100,000 140,000	30 ft. 0 in. 46 ft. 6 in.	All Steel	48,800 51,000	Friction	******	Pressed Steel Beth, Steel

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Purchaser	No.	Class	Capacity	Length	Construction	Weight	Draft Gear	Trucks	
Bangor & Aroostook	200		60,000	34 ft. 0 in. 36 ft. 9 in.	St. Cent. Sills	32,000	Spring	Arch Bar Arch Bar	
	200	D. S. Box Caboose	57,000	********	St. Cent, Sills	37,000	Friction		
Beacon Oil Company	10 20	Tank Tank	10,000g. 12,000g.		All Steel All Steel	*****	Friction Friction	Arch Bar Arch Bar	
Beaver Creek Log Co	20	Log. Trk.			All Steel All Steel	41 000		******	
Bertha Coal Co Bethlebem Mines Corp	300	Hopper Tank	110,000	33 ft. 73% in.	All Steel	41,880 49,600	Friction		
Bethlehem Steel Co	150 10	Hopper Tank	140,000	30 ft. 6 in. 33 ft. 71/6 in. 40 ft. 2 in. 33 ft. 71/6 in.	All Steel	55,400 49,600	Friction Friction	******	
Bloedel-Donovan Lbr. Co	1	Logging			All Steel	*****			
Bolene Refining Co Boliver Refining Corp	30	Tank Tank	8,050g. 8,050g.	******	All Steel	*****		Arch Bar Arch Bar	
Boston & Maine	100 200	Ballast Refrigerator	100,000 69,000	40 ft. 0 in. 40 ft. 536 in. 42 ft. 1½ in.	Steel Frame St. Und'frame	55,000	Friction Friction	St. Side Fr. St. Side Fr.	
	300	Flat	110,000	42 ft. 1½ in.	St. Und'frame		Friction	St. Side Fr.	
Bradford Oil Refining Co Brooks Scanlon Lbr. Co	20	Tank Logging	******		Composite				
Buffalo & Susquehanna	40 200	Logging Hopper	80,000 110,000	30 ft. 6 in.	Composite All Steel	40,600	Friction	Arch Bar	
Bradley Logging Co	1	Logging		******	All Steel All Steel		******	******	
Buckley Log Co	1	Logging Logging	200,000	********	All Steel	*****	******	******	
Buffalo, Rochester & Pittsburgh	50 25	Caboose Dump	*****	* * * * * * * * * *	Steel Frame	*****		******	
Cambria & Indiana	1,000	Hopper	110,000	30 ft. 6 in.	All Steel	41,000	Friction	St. Side Fr.	
Carlisle Pennell Lbr. Co Carolina, Clinchfield & Ohio	16	Logging Caboose	100,000	24 ft. 0 in.	Composite St. Und'frame	36,000	Friction	Arch Bar	
Case Shingle & Lbr	10 20	Logging Caboose	80,000	27 ft. 0 in.	Composite St. Und'frame	37,750	Friction	Arch Bar	
Central of Georgia	100	Flat	80,000	40 ft. 0 in.	Steel Frame	32,300	Friction	St. Side Fr.	
	300	D. S. Vent Box Hopper	80,000 100,000	40 ft. 0 in. 30 ft. 6 in.	St. Und'frame All Steel	45,500 41,100	Friction Friction	St. Side Fr. St. Side Fr.	
	200 100	Gondola Stock	80,000	41 ft. 6 in. 40 ft. 6 in.	Steel Frame	41,400 41,000	Friction Friction	St. Side Fr. St. Side Fr.	
Champlin Refining Co	6 271	Tank .	8,050g.	*****	All Steel			Arch Bar	
Chesapeake & Ohio	1,000	Tank Gondola	8,050g. 140,000	39 ft. 0 in.	All Steel	49,300	Friction	St. Side Fr. St. Side Fr.	
•	1,000	Gondola Caboose	140,000	39 ft. 0 in.	All Steel	49,300	Friction	St. Side Fr.	
Cheswick & Harmer	10	Hopper	110,000	30 ft. 6 in.	All Steel	41,330		******	
Chicago & Alton	250 350	Gondola Gon, Bod.	80,000		St. Und'frame St. Cent. Sills	*****		******	
Chicago & Illinois Midland	250 250	Gondola Gondola	*****		St. Und'frame				
Chicago & North Western	1,025	Box	80,000		St. Und'frame	*****			
	1,000	Tank S. S. Box	100,000 80,000	40 ft. 6 in.	All Steel Steel Frame	44,900		******	
Chicago, Great Western	1,000 300	D. S. Box	80,000	40 ft. 0 in.	St. Cent. Sills	41,900		Arch Bar	
Ch'go, North Shore & Milw	15 20	Gondola	100,000		All Steel		******	******	
Ch'go, R. I. & Pacific	500	Gondola S. S. Auto	100,000 80,000	50 ft. 036 in.	Steel Frame	53,000	Friction	St. Side Fr.	
	250 250	Flat Refrigerator	100,000 80,000	43 ft. 0 in. 33 ft. 2¾ in.	Steel Frame St. Und'frame	38,000 52,000	Friction Friction	St. Side Fr. St. Side Fr.	
Chino Copper Co	20	Hopper	120,000		All Steel St. Und'frame			Arch Bar	
Cispus Logging Co	. 8	Caboose Logging	60,000 80,000	26 ft. 0 in.	Steel Frame	35,200	Spring	Aren Dat	
Clark Wilson Lbr	10	Logging Logging	80,000	********	All Steel Composite				
Clemons Logging Co	10	Logging	80,000		Composite Wood		******	******	
Columbia & Nehalem Lbr. Co.	20	Caboose Logging	100,000		All Steel			* * * * * * *	
Coos Cedar Co	25	Logging Logging	100,000		Composite All Steel		******		
Cornwall	30	Gondola Tank	140,000 100,000	22 ft. 5 in.	All Steel	51,000	Friction	St. Side Fr. St. Side Fr.	
Cosden & Co	3	Tank	80,000	32 ft. 6 in.	All Steel	******	Friction	St. Side Fr.	
Cumberland & Pennsylvania Deep River Logging Co	6	Hopper Logging	100,000 80,000	30 ft, 9 in.	St. Und'frame Steel Frame	41,100	Friction	Arch Bar	
Dept. of Interior	1,000	Ballast S. S. Box	80,000	40 ft. 6 in.	Wood Steel Frame	44,700	Friction	St. Side Fr.	
Diamond Caldor Ry	6	Logging			Composite	******	******	*****	
Doherty, H. L., & Co	50 25	Tank Tank	8,000g. 10,000g.		*******		******		
Dold, Jacob, Packing Co	40 50	Flat Refrigerator	80,000	********	Wood		******	******	
Dollar Portland Lumber Co	- 12	Log. Trk. Log. Trk. Box	80,000		All Steel		****	*****	
Donovan Corkery Log Duluth, Missabe & Northern Eagle Falls Log. Co	100	Box	80,000		All Steel St. Und'frame		******		
Eagle Falls Log. Co	12	Logging Flat	200,000 70,000	34 ft. 6 in.	All Steel	21,400	Spring	St. Side Fr.	
East Broad Top	125	Tank Logging	100,000 200,000	36 ft. 6 in.	Steel Frame All Steel	38,000	Friction	Arch Bar	
East Side Mill & Lbr	60	Logging	100,000		All Steel			******	
Elsworth Bishop Log. Co Elgin, Joliet & Eastern	200	Log. Flat Hopper	200,000 140,000	39 ft. 6% in.	All Steel All Steel	57,000	Friction	St. Side Fr.	
	100 100	Hopper Gondola	140,000	39 ft. 6% in. 46 ft. 3 in.	All Steel Steel Frame	57,000 58,000	Friction Friction	St. Side Fr. St. Side Fr.	
	200	Gondola	140,000	46 ft. 3 in.	Steel Frame	58,000	Friction	St. Side Fr.	
Emlenton Refining Co	200	Gondola Tank	140,000 100,000	46 ft. 3 in.	Steel Frame All Steel	58,000 <b>49,700</b>	Friction Spring	St. Side Fr. Arch Bar	
Emmons Coal Mining Co	500	Hopper Tank	140,000 80,000	31 ft. 9¼ in.	All Steel St. Und'frame	41,000	Spring	Arch Bar	
Empire Refineries, Inc English Lumber Co	1	Logging Log. Trks.	200,000		All Steel			******	
Erie	2,000	Gondola	140,000	44 ft. 0 in.	All Steel	52,600	Friction	St. Side Fr.	
	1,000	S. S. Box S. S. Auto	80,000	40 ft. 6 in. 40 ft. 6 in.	Steel Frame Steel Frame	39,600 41,200	Friction Friction	St. Side Fr. St. Side Fr.	
Eureka-Nevada	5	Logging Logging	80,000		Composite All Steel	******			
Fisher Lumber Co	200	Logging	200,000		All Steel		Spring	St. Side Fr.	
Florida East Coast	200	D. S. Vent. Box	80,000	42 ft. 0 in. 41 ft. 0 in.	St. Und'frame	34,000	Spring	St. Side Fr.	
Ford Motor Company	10 25	Caboose Gondola	110,000	34 ft. 0 in.	St. Und'frame		Spring	St. Side Fr.	
Fruit Growers' Express	3,000	Spec. Flat Refrigerator	110,000 80,000	33 ft. 2¾ in.	All Steel St. Und'frame	52,500	Spring	Arch Bar	
General American Tank Car General Petroleum Corp	500	Tank			Steel Frame				
General Petroleum Corp General Sugar Co	100	Tank Cane	100,000	35 ft. 6 in.		54,500	Friction	Arch Bar	
Georgia	125	S. S. Box D. S. Box	60,000	36 ft. 0 in.	St. Und'frame Wood	38,800	Spring	St. Side Fr. Arch Bar	
Cillardia I C & Com	50	Stock	60,000	38 ft. 0 in.	Wood	40,900	Spring Friction	Arch Bar	
Gillespie, L. C., & Sons	6	Tank Tank	80,000 190,000	********	All Steel	48,000	Friction	Arch Bar Arch Bar	
Gilmore Oil Co	1	Tank Tank	10,000g. 8,000g.	********	All Steel	48,000 42,000	Friction Friction	Arch Bar Arch Bar	
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Builder Company Shops
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Company Shops
Am. Car & Fdy.
Am. Car & Fdy.
Pac. Car & Fdy.
Pac. Car & Fdy.
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Pressed Steel
Beth. Steel
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Company Shops
Pac. Car & Fdy.
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Pullman
General American.
Nagor
Company Shops
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Purchaser	No.	Class	Capacity	Length	Construction	Weight	Draft Gear	Trucks	Builder
Gilmore Oil Co	3	Tank	10,000g.		All Steel	48,000	Friction	Arch Bar	Gen. Amer. Tank Gen. Amer. Tank
	1,000	Tank	8,000g. 80,000	40 ft. 6 in.	All Steel Steel Frame	42,000 44,100	Friction Friction	Arch Bar St. Side Fr. St. Side Fr.	Pullman .
Great Northern	500	D. S. Box D. S. Auto	80,000	40 ft. 6 in.	Steel Frame	45,700	Friction	St. Side Fr.	Am. Car & Fdy Chicago Steel
a	125	. Tank Logging	100,000 80,000	36 ft, 6 in.	All Steel Composite	46,600	Friction	Arch Bar	Pac. Car & Fry.
Greenwood Log. Co	15	Logging	100,000		Composite				Pac. Car & Fdy. Pac. Car & Fdy.
Culf Defining Co.	50	Logging Tank	200,000 100,000		All Steel				Standard Steel
Gulf Refining Co	150	Tank			All Steel				Standard Steel Pac. Car & Fdy.
Hama Hama Logging Co	10	Log. Flat. Log. Trk.	200,000 100,000		All Steel				Pac. Car & Fdy.
Hama Hama Logging Co	6	Logging	80,000		Steel Frame				Pac. Car & Fdy. Pac. Car & Fdy.
Hammond Lbr. Co	10	Logging	80,000 100,000		Composite Composite				Pac. Car & Fdy.
	1	Logging Log. Flat	200,000		All Steel	*****			Pac. Car & Fdy. Standard Steel
Hillman Coal & Coke Hilman Coal & Coke Co	300 300	Hopper Hopper	100,000 140,000	39 ft. 0 in.	All Steel	50,000			Pressed Steel
Hocking Valley	1,000	H. B. Gondola	140,000	39 ft. 0 in.	All Steel	49,300	Friction Friction	St. Side Fr. St. Side Fr.	Am. Car & Fdy. Standard Steel
Homer Wilcox Co	1,000	H. B. Gondola Tank	140,000	39 ft. 0 in.	All Steel	49,300	*******		Standard Tank
Hurley Gasoline Co	5	Tank	8,050g.		All Steel			Arch Bar Arch Bar	Penn. Tank Penn. Tank
Hutchinson Lbr. Co	5 2	Tank Logging	8,050g.		All Steel Composité				Pac. Car & Fdy.
Illinois Central	500	Ballast	100,000	40 ft. 0 in.	All Steel St. Und'frame	51,100	Friction Friction	St. Side Fr.	Rodger Ballast Pullman
	1,750 750	Gondola Gondola	100,000 100,000	40 ft. 10 % in. 40 ft. 10 % in.	St. Und'frame	47,500	Friction	St. Side Fr.	General American
	500	Gondola	100,000	40 ft. 10% in.	St. Und'frame St. Und'frame	47,500	Friction Friction	St. Side Fr.	Bettendorf Keith Ry. Equip.
	500 1,000	Gondola Automobile	100,000 80,000	40 ft. 10% in. 40 ft. 6 in.	St. Und'frame	47,000	Friction	St. Side Fr.	Am. Car & Fdy. Western S. C. & F.
	500	Automobile	80,000	40 ft. 6 in.	St. Und'frame St. Und'frame		Friction Friction	St. Side Fr. Arch Ber	Mt. Vernon
	500 125	Automobile Caboose	80,000 60,000	40 ft. 6 in. 27 ft. 6-in.	St. Und'frame	40,600	Friction	St. Side Fr.	Am. Car & Fdv.
	50	Dump 3	0 cu. yd.	26 ft. 0 in.	St. Und'frame All Steel	42,000	Friction Friction	Arch Bar Arch Bar	West, Wh. Scraper Am. Car & Fdy. Standard Tank
Imperial Refining Co	50 50	Tank Tank	80,000 100,000	32 ft. 634 in. 36 ft. 3 in.	All Steel	42,000	Spring	Arch Bar	Standard Tank
Index Galena Lbr. Co	8	Logging	80,000		Composite St. Und'frame		Spring	Arch Bar	Pac. Car & Fdy. Company Shops
Indiana Harbor Belt Inman Poulsen Lbr. Co	15	D. S. Caboose Log. Flat	60,000 200,000	25 ft. 5 in,	All Steel	30,000	Spring		Pac. Car & Fdy. Pac. Car & Fdy.
Insular Lbr. Co	6	Logging	60,000	*******	Composite All Steel				Pac. Car & Fdy.
Insular Lumber Co	6	Logging Logging	<b>40,000 60,000</b>		Composite				Pac. Car & Fdy.
	1	Logging	100,000	********	All Steel	41,490	Spring		Pac. Car & Fdy. Pressed Steel
Interstate	500	Hopper Caboose	110,000	30 ft. 5 in.	St. Und'trame		Spring		Standard Steel
Interstate Pub Service Co	10	Stock	200,000		All Steel				Am. Car & Fdy. Pac. Car & Fdy.
Irving Hartley Logging Co  Jamestown-Oregon Lbr  Johnstown Coal & Coke Co  Jonesboro, Lake City & Eastern	8	Logging Log. Trk.	80,000		All Steel				Pac Car & Edw
Johnstown Coal & Coke Co	150 75	Hopper	110,000 60,000	36 ft. 0 in.	Wood	60,000	Friction	Arch Bar	Am. Car & Fdy.
	25	S. S. Box S. S. Box	60,000	40 ft. 0 in.	Wood	60,000	Friction	Arch Bar	Am. Car & Fdy. Am. Car & Fdy. Am. Car & Fdy. Pac. Car & Fdy.
Kalambugan Lbr. & Dev. Co Kansas City Southern	501	Logging S. S. Box	50,000 80,000	40 ft. 8 in.	All Steel Steel Frame	45,000	Spring	St. Side Fr.	Pennsylvania Car
Kendall Refining Co	9	Tank	80,000		Steel Frame			St. Side Fr.	Warren Tank
Kerry Timber Co	3 20	Logging Log. Trk.	*****	********	Steel All Steel				Pac. Car & Fdy. Pac. Car & Fdy.
Kingan Refrigerator Line	100	Refrigerator	60,000	36 ft. 0 in.	St. Cent. Sills	54,800	Friction	St. Side Fr.	General American General American
King Chemical Co	2 8	Tank Logging	50,000		All Steel	*****		******	Pac. Car & Fdy.
Koster Products Co	8	Log. Trk.			All Steel			*****	Pac. Car & Fdy. Pac. Car & Fdy. Pac. Car & Fdy.
Lehigh & New England	6 7	Logging Caboose	100,000		All Steel Steel Frame		Spring	St. Side Fr.	Magor
Lidgerwood Mfg. Co	2	Logging	120,000		All Steel		******	******	Pac. Car & Fdy. Pac. Car & Fdy.
	1	Logging Logging			All Steel		*******	Arch Bar	Pac. Car & Fdy.
Lion Oil & Refining Co	70	Tank	80,000g.	40 ft. 6 in.	All Steel		******	Arch Bar Arch Bar	Chicago St. Car Chicago St. Car
Little River Redwood Co	30 8	Tank Logging	10,000g. 80,000	40 ft. 6 in.	Composite	*****			Pac. Car & Fdy. Pac. Car & Fdy.
	10	Log. Flat	80,000 60,000	36 ft. 0 in.	Composite All Steel	*****	Friction	St. Side Fr.	Pac. Car & Fdy. New City Car Co.
Live Poultry Transit Co Los Angeles & Salt Lake	500 15	Poultry Caboose		39 ft. 3 in.	St. Und'frame	36,370	Friction	St. Side Fr.	New City Car Co. O. W. R. & N. Shop Am. Car & Fdy.
Louisiana & Arkansas Louisville & Nashville	6.000	Hart Conv.	100,000	40 ft. 0 in. 30 ft. 6 in.	Steel Frame All Steel	41,000	Friction Friction	St. Side Fr. St. Side Fr.	Pressed Steel
Louisville & Nashville	1,000	S. S. Box S. S. Box	80,000	36 ft. 1 in.	Steel Frame	43,600	Friction	St. Side Fr.	Mt. Vernon
Lanianitta Hand & St. Louis	1,000	S. S. Box Hopper	80,000 110,000	36 ft. 1 in. 30 ft. 6 in.	Steel Frame All Steel	43,600 41,330	Friction	St. Side Fr.	Chickasaw Ship Pressed Steel
Louisville, Hend. & St. Louis. Lyman Timber Co	12	Logging	80,000		Composite All Steel	,,,,,,,			Pac. Car & Fdy.
McCuish Logging Co McMan Oil & Gas Co	15	Log. Flat Tank	200,000						Pac. Car & Fdy. Pac. Car & Fdy. Standard Tank
Manary Log. Co	. 1	Logging	200,000		All Steel				Pac. Car & Fdy. Pac. Car & Fdy.
Mason City Log. Co	25	Logging Spec. Tank	60,000		All Steel				Standard Steel
Manary Log. Co	8	Logging	80,000		Steel Frame				Pac. Car & Fdy. Pac. Car & Fdy.
Merrill & Ring Lbr. Co	1	Logging Logging	120,000 200,000		All Steel				Pac. Car & Fdy.
Merrimac Chemical Co	2	Tank	80,000	38 ft. 0 in.	Steel Frame All Steel	48,860 46,000	Friction Friction	Arch Bar Arch Bar	General American
Mexican Petroleum Corp	50 25	Tank Tank	100,000	31 ft. 0½ in. 31 ft. 0½ in.	All Steel	42,000	Friction	Arch Bar	Standard Tank Standard Tank
	25	Tank	80,000	31 ft. 8 in.	All Steel	41,000	Friction Friction	Arch Bar Arch Bar	General American
	165 100	Tank Tank	100,000 80,000	28 ft. 0 in. 28 ft. 0 in.	All Steel	44,500 42,000	Friction	Arch Bar	Am. Car & Fdy. Am. Car & Fdy. Am. Car & Fdy.
N. 11 0 1	1	Tank	80,000	28 ft. 0 in.	All Steel St. Und'frame	43,000	Friction Friction	Arch Bar St. Side Fr.	Am. Car & Fdy. Merchants Desp.
Michigan Central	2,000 1,500	Refrigerator Automobile	70,000	33 ft. 0 in. 40 ft. 6 in.	All Steel All Steel	46,700	Friction	St. Side Fr. St. Side Fr. St. Side Fr. St. Side Fr. St. Side Fr. St. Side Fr.	Am. Car & Fdy. Standard Steel
	500 100	Automobile	110,000 100,000	40 ft. 6 in. 40 ft. 0 in.	All Steel St. Und'frame	46,700	Friction Friction	St. Side Fr.	Am. Car & Edw
	25	Ballast Caboose	60,000	32 ft. 0 in.	St. Und'frame	39,000	Spring	St. Side Fr.	Am. Car & Fdy. Company Shops
Midland Refining Co	100	Tank	100,000 200,000		All Steel				
Miller Log. Co	200	Logging Flat	200,000		Composite All Steel				Pac. Car & Fdy.
Mineral Lake Log. Co Minn., St. P. & S. Ste. Marie. Minnesota Steel Co	1	Logging	80,000	40 ft. 6 in.	All Steel Steel Frame	44,300	Friction	St. Side Fr.	Pac. Car & Fdy. Pac. Car & Fdy. Pac. Car & Fdy. Pac. Car & Fdy. Am. Car & Fdy. Standard Steel
Minnesota Steel Co	200	Flat	150,000		All Steel			******	Standard Steel
Mex, Ira J., Dairy Co	44	Hopper Lined Tank	100,000	30 ft. 0 in.	All Steel	44,800			Pressed Steel Pfaudler Co.
Mobile & Ohio	400	D. S. Box	80,000	36 ft. 0 in.	St. Und'frame	42,600	Friction	Arch Bar	Am. Car & Fdy.
•	100 200	Stock Hopper	80,000	40 ft. 0 in. 30 ft. 9 in.	St. Und'frame Steel Frame	42,600 43,100	Friction Friction	Arch Bar Arch Bar	Am. Car & Fdy. Am. Car & Fdy.
Montana, Wyoming & Southern	25	Gondola	100,000	40 ft. 01/2 in.	Steel Frame St. Und'frame	40,600 41,000	Friction Friction	Arch Bar St. Side Fr.	Am. Car & Fdy. Mt. Vernon
Montour Logging Co	500	Hop. Gond. Logging	110,000	30 ft. 6 in.	All Steel Steel Frame	41,000	Friction	St. Side Fr.	Standard Steel Pac. Car & Fdy.
Nehalen Thr. & Log. Co	10	Logging	80,000	******	All Steel			******	Pac. Car & Fdv.
Neils, L. Lbr. Co	10 5 3	Logging Logging	100,000 80,000		Composite		******		Pac. Car & Fdy. Pac. Car & Fdy. Am. Car & Fdy.
Neils, J., Lbr. Co New England Fuel & Trans. Co		Tank	7,000g.		All Steel		Friction	Arch Bar	Am. Car & Fdy. Am. Car & Fdy.
New England Oil Ref. Co	250	Tank Tank	******		Steel Frame			*****	Gen. Am. Tank Am. Car & Fdy.
New Jersey, Indiana & Ill	150	Auto	80,000	******	Steel Frame	*****	******		Am. Car & Fdy.

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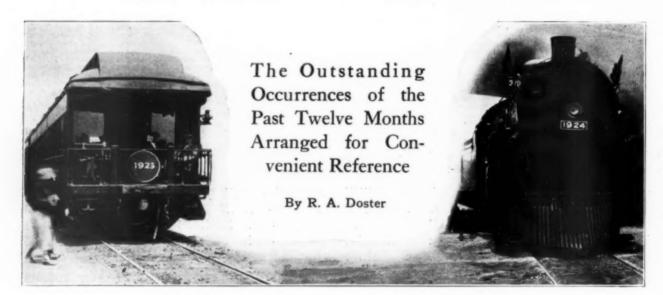
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Purchaser	No.	Class	Capacity	Length	Construction	Weight	Draft Gear	Trucks	Builder
New Haven Gas Light Co	2	Tank Tank	******		******	******	******	C. C.I. D	Standard Tank Standard Tank
New York Central	1,500	Spec, Flat Hopper	140,000	45 ft. 0 in. 39 ft. 0 in.	Steel Steel	60,100 50,300	Friction Friction	St. Side Fr. St. Side Fr.	Standard Steel Standard Steel
New York, Chicago & St. Louis		Hopper Hopper	140,000 110,000	39 ft. 0 in. 33 ft. 8 in.	Steel Frame	50,000 42,300	Friction Friction	St. Side Fr. St. Side Fr.	Pressed Steel Pressed Steel
N. Y., N. H. & Hartford		Gondola Transformer	110,000 140,000	48 ft. 6 in.	Steel Frame Steel	48,900	Friction Friction	St. Side Fr. St. Side Fr.	Standard Steel Standard Steel
Norfolk & Western Northwest Lbr. Co	1	Logging Logging	200,000	24 ft. 1¾ in.	Steel Frame All Steel	42,800	Friction	St. Side Fr.	Company Shops Pac. Car & Fdy.
North Bend Lbr. Co N. T. U. Company	2	Log. Flat Dump	200,000 100,000		All Steel			******	Pac. Car & Fdy. Pac. Car & Fdy.
Oliver Mining Co Omaha Refining Co	10	Flat Tank	100,000 8,050g		St. Und'frame All Steel			Arch Bar	Mt. Vernon Penn. Tank
Oregon-Kalama Lbr	6	Logging Logging	80,000	*********	All Steel Composite		******		Pac. Car & Fdy. Pac. Car & Fdy.
Oregon Tim. & Lbr. Co	10	Log. Trk.	100,000	39 ft. 3 in.	St. Und'frame All Steel	36,370	Friction	St. Side Fr.	O. W. R. & H. Shops Pac. Car & Fdy.
Ostrander Ry. & Tbr Pan-American Petroleum Co	6	Logging Tank	200,000 12,000g.	37 ft. 634 in.	All Steel		******		Pac. Car & Fdy. Am. Car & Fdy.
Peninsular Ry	53	Tank Log. Trk.	10,000g. 100,000	32 ft. 6¾ in.	All Steel Composite				Am. Car & Fdy. Pac. Car & Fdy.
Pennsylvania Salt Mfg. Co	1 4	Log. Trk.	80,000		All Steel Steel	*****	* * * * * * * *	******	Pac. Car & Fdy. Gen. Amer. Tank
Pennsylvania Tank Line	200	Tank Tank	8,050g.		Steel All Steel	*****	******	Arch Bar	Am. Car & Fdy. Penn. Tank
	8	Tank Tank	8,050g. 8,050g.		All Steel		******	Arch Bar Arch Bar	Penn, Tank Penn, Tank
Pere Marquette	300 100	Refrigerator Tank	80,000	39 ft. 75% in.	St. Und'frame	53,000	Friction	St. Side Fr.	Company Shops Standard Tank
Phoenix Log. Co	12 15	Logging Logging	100,000 80,000		Composite Composite				Pac. Car & Fdy. Pac. Car & Fdy.
Pioneer Sand & Gravel Pittsburgh & Lake Erie	300	Dump Hopper	40,000 140,000	39 ft. 10 in.	All Steel	52,000	Friction	St. Side Fr.	Pac. Car & Fdy. Pressed Steel
Poinsett Lumber & Mfg. Co	18	Caboose Log. Flat	80,000	29 ft. 4 in.	St. Und'frame All Steel		Spring	St. Side Fr.	Company Shops Bettendorf
Portland Ry. Lt. & Pr	50 20	Flat Logging	80,000 100,000	*******	Composite Composite			******	Pac. Car & Fdy. Pac. Car & Fdy.
Portland Ry. Lt. & Pr Powers & Quinlan	30	Flat Tank			Wood				Pac. Car & Fdy. Standard Tank
Powers & Quinlan Producers' & Refiners' Corp Prudential Oil Corp	100	Tank Tank	80,000 100,000		All Steel	51,400	Friction Friction	Arch Bar Arch Bar	Gen. Amer. Tank
Public Service Co. of Ill	4 2	Gondola Hopper	100,000		All Steel			******	Am. Car & Fdy. Mt. Vernon Mt. Vernon
Public Serv. Co. of No. Ill Puget Mill Co	12	Hopper Logging	140,000 80,000	39 ft. 0 in.	All Steel Composite	51,000		*****	Pressed Steel Pac. Car & Fdy.
Red River & Gulf	40	Caboose Logging	80,000		St. Und'frame Composite			******	Mt. Vernon Pac. Car & Fdy,
Republic Iron & Steel Co	50	Gondola Dump	140,000 100,000	32 ft. 2 in.	All Steel All Steel	58,400	Friction	Arch Bar	Standard Steel Beth, Steel
Richmond, Fred. & Potomac Roxanna Petroleum Co Royal Shingle Co	350	Tank Log. Flat	70,000	**********	Composite		******		Standard Tank Pac. Car & Fdy.
Saginaw Tbr. Co	500	Log. Flat	200,000	********	All Steel			******	Pac. Car & Fdy. Am. Car & Fdy.
Samish Bay Log. Co	500	Box Logging	80,000 80,000	*********	Composite	*****	******	******	Am. Car & Fdy. Pac. Car & Fdy.
San Antonio & Aransas Pass San Diego & Arizona	25	S. S. Auto Stock	80,000 80,000	40 ft. 6 in.	Steel Frame	47,000	Friction	St. Side Fr.	Orange C. & S. Pullman
Sand Pt. Lbr. & Pole Co Sand Springs	10	Logging Tank	60,000 8,000g.		Composite		******	******	Pac. Car & Fdy. Gen. Amer. Tank
San Fran., Napa & Calisto	Ĭ	Ballast Logging	80,000	*********	Composite Composite		******	******	Pac. Car & Fdy. Pac. Car & Fdy.
San Fran., Napa & Calisto Scanlon, M. J., Lbr. Co Schafer Bros. Log. Co Seaboard Air Line	15 25	Logging Caboose	80,000	********	Composite Steel Frame		******	******	Pac. Car & Fdy. Magor
presonate and amount of the	1	Scale Test Scale Test	80,000 40,000		All Steel All Steel		******		Magor Magor
	500 500	Box Box	80,000 80,000	36 ft. 0 in. 36 ft. 0 in.	Steel Frame Steel Frame	44,800 44,800	Spring Friction	St. Side Fr. St. Side Fr,	Pressed Steel Pressed Steel
	800 200	Gondola Gondola	100,000	41 ft. 6 in. 41 ft. 6 in.	Steel Frame Steel Frame	42,300 42,300	Spring Spring	St. Side Fr. St. Side Fr.	Standard Steel Newport News
Seattle City of	28	Caboose Flat	60,000 70,000	30 ft. 0 in.	Steel Frame Composite	43,900	Friction	St. Side Fr.	Magor Pac. Car & Fdy.
Seattle, City of	60 79	Tank Tank	100,000	35 ft. 6 in. 35 ft. 6 in.	All Steel All Steel	46,500 46,500	Friction Friction	Arch Bar Arch Bar	Penn. Tank Standard Tank
Silver Lake Ry. & Lbr. Co Siler Logging Co	5 2	Log. Trk. Logging	100,000		All Steel Steel Frame	*****	******	******	Pac. Car & Fdy. Pac. Car & Fdy.
Sinclair Refining Co	10	Logging Tank	100,000		All Steel All Steel	38,000	Friction	Arch Bar	Pac. Car & Fdy. Company Shops
Discussion of the control of the con	10	Tank Tank	80,000		All Steel	47,000 41,000	Friction Friction	Arch Bar Arch Bar	Standard Car Con. Standard Car Con.
Skelly Oil Co Smith, M. R., Lbr. & Shgl. Co.	50	Tank Logging	8,000g. 70,000		Composite		******	*****	Standard Tank Pac. Car & Fdy.
Snyder, C. U., & Co	1 25	Logging Tank	8,050g.		All Steel		******	St. Side Fr.	Pac. Car & Fdy. Penn. Tank
Sorenson Weist Log Southern Carbon Co	25	Logging Tank	100,000		All Steel		******	******	Pac. Car & Fdy. Standard Tank
Southern Pacific	16 90	Dump Caboose	20 cu. yd.	*********			* * * * * * *	******	Kilb. & Jacobs Company Shops
	300 500	Flat Logging				*****	*****		Company Shops Company Shops
	2,975 450	Box Flat	100,000				* * * * * * *	******	Standard Steel Ralston
	250 500	Stock Gondola	*****		*******		******	******	Ralston Ralston
	200 600	Tank Gondola	12,500g.		******		******	******	Gen. Amer. Tank General American
	500 500	Auto				*****	******	******	Pullman Company Shops
	500 75	Logging Caboose				*****		*****	Company Shops Company Shops
	575 575	Gen'l Serv. Gen'l Serv.	100,000 100,000		* * * * * * * *	******	* * * * * * * *		General American Ralston
Southern Railway	300 1,000	Work	100,000 80,000	36 ft. 0 in.	St. Und'frame	42,600	Friction	Arch Bar	Mt. Vernon Standard Steel
	1,500 570	D. S. Box D. S. Box D. S. Box D. S. Box	80,000	36 ft. 0 in.	St. Und'frame St. Und'frame	42,600 42,600	Friction Friction	Arch Bar Arch Bar	Am. Car & Fdy. Mt. Vernon
	3,000	D. S. Box Stock	80,000	36 ft. 0 in. 40 ft. 0 in.	St. Und'frame St. Und'frame	42,600 45,900	Friction Friction	Arch Bar Arch Bar	Am. Car & Fdy. Kilby C. & F.
	1,500 1,365	Hopper Hopper	100,000	30 ft. 9 in. 30 ft. 9 in.	Steel Frame Steel Frame	43,100	Friction Friction	Arch Bar Arch Bar	Standard Steel Am. Car & Fdy.
	2,550 137	Hopper Hopper	100,000	41 ft. 9 in. 30 ft. 0 in.	Steel Frame Steel Frame	44,500 39,500	Spring Spring	******	Lenoir Lenoir
Spokane, Portland & Seattle	50	Flat Flat	80,000	41 ft. 0 in. 41 ft. 0 in.	St. Und'frame St. Und'frame	29,400 36,000	Spring Friction	Arch Bar St. Side Fr.	Company Shops Am. Car & Fdy.
Standard Animal Products Co. Standard Oil Co. of N. J	12	Tank Dump	8,050g. 100,000	********	All Steel	******	******	Arch Bar	Penn. Tank Am. Car & Fdy.
Sterling Oil & Refining Co	10 50	Dump	80,000		All Steel	40,000	******	Arch Bar	Am. Car & Fdy. Standard Tank
	22	Tank	80,000	********	All Steel	40,000	******	Arch Bar	Penn. Tank

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Purchaser	No.	Class	Capacity	Length	Construction	-	Draft Gear	Trucks	Builder Pressed Steel
Stone & Webster Eng. Corp Sugar Pine Lbr. Co	2	Hopper Log. Flat	110,000 200,000		All Steel		* * * * * * *		Pac. Car & Fdy.
Sun Oil Company	150	Tank	100,000		All Steel	*****			Am. Car & Fdy.
	150	Tank	*****	*******		*****		******	Standard Tank Company Shops
Swift & Co Taylor, Lowenstein & Co	200	Refrigerator Tank	60,000		All Steel	35,000	Friction	Arch Bar	Am. Car & Fdy.
Tennessee Coal & Iron	25	Hopper	140,000	38 ft. 0 in.	St. Und'frame	56,600	Friction	St. Side Fr.	Chickasaw
Texas Company	25	Tank	80,000		All Steel	42,200	Friction	Arch Bar	Gen. Amer. Tank
	75 50	Tank Tank	80,000 100,000		All Steel	38,800 44,800	Friction Spring	Arch Bar St. Side Fr.	Gen. Amer. Tank Standard Tank
	50	Tank	80,000		All Steel	39,500	Spring	St. Side Fr.	Chicago St. Car
	200	Tank	80,000		All Steel	40,000	Spring	St. Side Fr.	Penn. Tank Pac. Car & Fdy.
Tidewater Timber Co Transcontinental Oil Co	50	Log. Flat Tank	200,000 80,000		All Steel Steel		Friction		Gen. Amer. Tank
Trinity City Lumber Co	125	Logging	100,000		All Steel				Bettendorf
Tucson, Cornelia & Gila Bend.	66	Concentrate	120,000		All Steel	42,000	Friction	St. Side Fr.	Mt. Vernon
U. G. I. Contract Co Ulster & Delaware	200	Hopper Caboose	100,000 60,000	23 ft. 33% in.	All Steel Steel Frame	45,900			Am. Car & Fdy Pressed Steel
Union	100	Dump	00,000	23 11. 398 111.	Steer Frame	43,500			Greenville
Union Oil Co. of Calif	155	Tank	100,000	36 ft. 0 in.	All Steel	47,500	Friction	Arch Bar	Gen. Amer. Tank
	13	Tank	80,000	36 ft. 0 in. 36 ft. 0 in.	All Steel	39,300 46,600	Friction Friction	Arch Bar Arch Bar	Gen. Amer. Tank Gen. Amer. Tank
Union Pacific	200	Tank Tank	80,000 12,500g.		All Steel	50,900	Friction	St. Side Fr.	Standard Tank
Onion Lucino	50	Caboose	*****	39 ft. 3 in.	St. Und'frame	36,370	Friction	St. Side Fr.	O. W. R. & N. Shop
Union Refrig. Transit Co	105	Refrigerator	80,000	32 ft. 93% in.	St. Und'frame	57,500	Friction	St. Side Fr.	Company Shops
United States Fuel Co	500	Refrigerator Hopper	80,000 140,000	34 ft. 3 in.	Steel Frame	61,000	Friction	St. Side Fr.	Company Shops General American
U. S. Stl. Products Co	7	Flat			St. Und'frame				Pac. Car & Fdv.
Universal Portland Cement Co	300	Box	100,000	********	All Steel	*****			Am. Car & Fdy.
Utah Copper Co Vance Lumber Co	6	Caboose Flat	70.000		Steel Frame Wood		* * * * * * *		Magor Pac. Car & Fdy.
vance Eumber Co	3	Logging	80,000		Composite	*****	******		Pac. Car & Fdy.
Vancouver Equip. Co	124	Logging	80,000	*******	Composite		* * * * * * *	******	Pac. Car & Fdy.
	1	Logging Log. Flat	70,000 70,000		Composite Wood	*****			Pac. Car & Fdy. Pac. Car & Fdy.
	2 2	Log. Flat Log. Trk.			All Steel	*****			Pac. Car & Fdy.
	1	Ballast	70,000		Composite			******	Pac. Car & Fdy.
	2 3	Logging	100,000		All Steel	*****	******	******	Pac. Car & Fdy. Pac. Car & Fdy.
	3	Log. Flat Logging	80,000		Composite	* * * * * * *			Pac. Car & Fdy.
	2 2	Logging	*****		All Steel	*****			Pac. Car & Fdy.
	7	*****	80,000		Composite			*****	Pac. Car & Fdv.
	1	Logging	200,000 40,000	******	All Steel All Steel	*****			Pac. Car & Fdy. Pac. Car & Fdy.
	2	Trk. Lay. Logging	15,000		Composite	*****			Pac. Car & Fdy.
Virginian		Gondola	240,000	49 ft. 6 in.	All Steel All Steel	79,800	Friction	St. Side Fr.	Pressed Steel
117 1 1	50	Hopper	140,000	39 ft. 0 in.	All Steel	49,500	Friction	St. Side Fr.	Standard Steel
Wabash	1.750	Box Box	80,000	40 ft. 6 in.	St. Und'frame St. Und'frame	38,000	Friction	St. Side Fr.	Am, Car & Fdy. Western S. C. & F.
	250	Gondola	140,000	48 ft. 6 in.	All Steel	53,000	Friction	St. Side Fr.	General American
Wallace Lbr. & Mgr. Co	1	Log. Trk.			All Steel		******		Pac. Car & Fdy. Penn. Tank
Walsh, John R	3	Tank	8,050g.	*******	All Steel All Steel	*****	******	Arch Bar	Penn. Tank
Washington Iron Wks	4	Logging Logging	120,000		Composite	*****	******	St. Side Fr.	Pac. Car & Fdy. Pac. Car & Fdy.
	1	Logging	60,000		Composite		******	******	Pac. Car & Fdv.
	2	Logging			All Steel	*****			Pac. Car & Fdv.
Webb Log. & Tfr. Co	20	Logging	120,000 80,000		Composite Composite			******	Pac. Car & Fdy. Pac. Car & Fdy.
Western Pacific	200	Logging Auto	30,000		Composite	*****			Standard Tank
	100	Logging	80,000	42 ft. 0 in.	Steel Frame	27,200	Spring	Arch Bar	Pac. Car & Fdy.
West Fork Logging Co	14	Logging	90,000		Wood Steel Frame	*****	******	******	Pac. Car & Fdy.
	14 16	Logging Logging	80,000 100,000	******	All Steel				Pac. Car & Fdy. Pac. Car & Fdy.
Westmoreland Coal Co	200	Gondola	110,000	30 ft. 6 in.	Steel	40,000	Friction	St. Side Fr.	Pressed Steel
White Eagle Oil & Ref. Co	100	Tank	8,000g.	38 ft. 6 in.	All Steel	40,700	Friction	St. Side Fr.	Pressed Steel Penn. Tank Pac. Car & Fdy.
White Star Lbr. Co	1 2	Log. Flat	200,000	27 64 AT/ im	All Steel Steel Frame	40,500	Friction	Arch Bar	Pac. Car & Fdy.
Wilburine Oil Works, Ltd Williamette Iron & Steel	1	Tank Log. Flat	80,000 120,000	27 ft. 4½ in.	All Steel	******		Arch Dat	Standard Tank Pac. Car & Fdy.
THE PARTY OF THE P	12	Logging	*****		All Steel	*****			Pac. Car & Fdy.
	1	Logging		********	Composite		******		Pac. Car & Fdy.
	2	Logging Logging	120,000		Composite Composite		******	******	Pac. Car & Fdy. Pac. Car & Fdy.
	1	Logging	120,000	*******	All Steel		******	* ******	Pac. Car & Fdy.
Willcox Oil & Gas Co	10	Tank	8,000g.		Companie		******		Standard Tank
Wood & Iverson Co	10	Logging Logging	80,000 100,000		Composite Composite	******	******		Pac. Car & Fdy. Pac. Car & Fdy.
yaoone rimber bo	49	20891118	20,000						wo. oar a ruy.
b				Canada	1				
P-1 P C-	12	Tagging	60,000		St. Und'frame		Spring		Can Car & Edv
Belgo Paper Co	1.000	Logging S. S. Box	80,000	36 ft. 0 in.	Steel Frame	40,300	Friction	Arch Bar	Can. Car & Fdy. Can. Car & Fdy.
	1,000	S. S. Box S. S. Box S. S. Box S. S. Box S. S. Box	80,000	36 ft. 0 in.	Steel Frame	40,300	Friction	Arch Bar	National Steel
	500	S. S. Box	80,000	36 ft. 0 in. 40 ft. 6 in.	Steel Frame Steel Frame	40,300	Friction Friction	Arch Bar Arch Bar	Eastern Car Can. Car & Fdy.
	750 250	S. S. Box	120,000 120,000	40 ft. 6 in.	Steel Frame	46,800	Friction	Arch Bar	National Steel
	1,000	Auto	80,000	40 ft. 6 in.	Steel Frame	45,900	Friction	Arch Bar	Pressed Steel
	600	Auto	80,000	40 ft. 6 in.	Steel Frame	45,900	Friction Friction	Arch Bar	Can. Car & Fdy.
	400 12	Auto Dep. Flat	80,000 150,000	40 ft. 6 in. 40 ft. 6 in.	Steel Frame Steel Frame	45,900 55,200	Friction	Arch Bar St. Side Fr.	National Steel Can. Car & Fdy.
	9	Snow Plow		19 ft. 41/4 in.	All Steel		Spring	Arch Bar	Eastern Car
	100	Ballast	160,000	40 ft. 0 in.	All Steel	47,100 46,200	Friction Friction	Arch Bar Arch Bar	Can. Car & Fdy.
i i	100 100	Gen. Serv. Hopper	100,000 160,000	41 ft. 6 in. 41 ft. 6 in.	All Steel	42,600	Friction	Arch Bar	Eastern Car Eastern Car
	100	Gondola	100,000	41 ft. 6 in.	All Steel	46,150			Pressed Steel
	300	Hopper	100,000	30 ft. 0 in.	All Steel	39,100	Friction		Eastern Car
Canadian Pacific	142	Refrigerator	80,000	34 ft. 4 in. 42 ft. 0 in.	St. Und'frame St. Und'frame	66,200 38,000	Friction Friction	******	National Steel Eastern Car
	300 300	Flat Coal	150,000	41 ft. 6 in.		30,000	Friction		Can. Car & Fdy.
	1,000	D. S. Box	*****	36 ft. 0 in.	St. Und'frame			******	Company Shops
	300	Auto		40 ft. 6 in.	Steel Frame			******	Company Shops
	28 22	Tank Tank	*****	*********	******				Company Shops
	108	Refrigerator				******			
Sydney & Louisburg	200	Coal	100,000	30 ft. 0 in.	All Steel	42,400	Friction		Eastern Car
Temiskaming & No. Ontario	2	Snow Plows	*****	********	All Steel	41 000	Spring	******	Can. Car & Fdy. National Steel
	50	Bex	80,000	36 ft. 0 in.	*******	41,000	******		Mational Steel
				Expor	t			0.00	
A		<b>7</b> 0 1	10.000		All Carel			Arch Ban	Donn Touls
Argentine Govt. Oil Fields	2 4	Tank Hopper	10,000g. 100,000		All Steel All Steel	*****		Arch Bar	Penn. Tank Mt. Vernon
Cuba Cane Sugar Corp	35	Cane	60,000		All Steel	*****		*****	Am. Car & Fdy.
	25	Cane	30,000	********	St. Und'frame	*****	*****	******	Am. Car & Fdy. Koppel
Newf'dl'd Hydro-Elec, & Pr. Co.	25	Hopper	66,000	********		*****			Magor Magor
Ulen Contracting Co U'ted Fruit Co. (for H'du'as).	35 100	Flat Flat	40,000		*******			******	Magor
	10	Flat	40,000	*******	******	*****		*****	Gregg
West India Sugar Fin. Corp	160	Cane	60,000	* * * * * * * * *		*****	******	******	Magor

### Chronological Review of Major Events of 1923



#### **JANUARY**

January 1, 1923.—Balthasar H. Meyer assumed chairmanship of the Interstate Commerce Commission.

January 4.—Supreme Court of the District of Columbia denied the St. Louis-Southwestern petition to compel the Interstate Commerce Commission to show the railway the records on which the Bureau of Valuation had based its valuation.

January 8.—Van Sweringen interests acquired control of Chesapeake & Ohio.

January 11.—Interstate Commerce Commission announced an investigation into the efficiency and economy of railroad management.

January 31.—Interstate Commerce Commission ordered 185 roads to place on sale non-transferable interchangeable scrip coupon tickets on March 15.

#### FERRITARY

February 1.—Signal department employees granted time and one-half by the Railroad Labor Board for overtime after the eighth consecutive hour of service, but were denied increases in rates of pay.

February 5.—American Railway Association reported to Interstate Commerce Commission that Warfield plan for pooling freight car equipment is economically unsound and impracticable of application.

February 6.—Continuation of control of Central Pacific by Southern Pacific approved by Interstate Commerce Commission.

February 8.—Interstate Commerce Commission ordered investigation into transportation and distribution of anthracite coal since September 22, 1922, with view to issuing orders for priority in car service.

February 17.—Western transcontinental roads agreed on new schedule of rates on manufactured products to enable them to compete with Panama canal for West Coast business.

February 19.—United States Supreme Court sustained right of Railway Labor Board to prescribe methods of selecting employee representatives, in controversy with Pennsylvania.

February 19.—W. B. Biddle, former president of St. Louis-San Francisco, died at Chicago.

February 19.—United States Supreme Court sustained decision of Interstate Commerce Commission ordering increase of 15 per cent in divisions received by New England lines of through rates to and from points west of Hudson river.

February 23.—Presidents of Eastern roads decided to contest order of Interstate Commerce Commission providing for interchangeable scrip book.

February 24.—Interstate Commerce Commission authorized Louisville & Nashville to issue \$45,000,000 capital stock to be distributed as dividend.

February 27.—Interstate Commerce Commission refused to order roads to place embargo against transportation of anthracite coal to Canada or any foreign country.

#### MARCH

March 1.—Pay of railroad freight handlers and express employees increased two cents an hour by Railroad Labor Board.

March 2.—T. W. Krein, general manager and receiver of Muscatine, Burlington & Southern, sentenced to serve one year in federal prison, Leavenworth, Kan, for overcharging other roads for car repairs.

March 10.—Rules governing issuance and use of scrip books issued by Interstate Commerce Commission.

March 17.—Recapture provisions of Transportation Act held constitutional by special court at New Orleans in action on petition of Dayton-Goose Creek for injunction suspending order of Interstate Commerce Commission.

March 26.—L. W. Baldwin elected president of Missouri Pacific, succeeding B. F. Bush, elected chairman of board in place of Harry Bronner.

#### APRIL

April 10.—Stuyvesant Fish, president of Illinois Central from 1887 to 1907, died in New York.

April 23.—Interstate Commerce Commission began hearings in its investigation of economy and efficiency of railroad management.

April 23.—Federal District Court of Massachusetts issued permanent injunction restraining Interstate

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Commerce Commission from enforcing its interchangeable mileage book order.

April 27.—Pennsylvania announced to Railroad Labor Board its intention to hold strictly to conviction that it has lawful right to establish rules and working conditions with its employees.

#### MAY

- May 1.—Virginian Railway awarded contract for electrification of its line between Roanoke, Va., and Mullens, W. Va.
- May 2.—Hearing of plea of attorney general to make permanent temporary injunction against strike violence by railroad shopmen reopened in Chicago.
- May 11.—R. M. Barton and Horace Baker reappointed, and E. F. Grable appointed to succeed Albert Phillips on Railroad Labor Board.
- May 11.—Frank McManamy appointed member of Interstate Commerce Commission to succeed W. M. Daniels, resigned.
- May 15.—Representatives of five farmers' organizations urged immediate general reduction in freight rates on farm products.
- May 16.—George J. Gould, railroad financier, died at Mentone, France.
- May 17.—Louisville & Nashville announced lease of Carolina, Clinchfield & Ohio for 99 years.
- May 18.—Interstate Commerce Commission denied application of St. Louis-San Francisco to acquire control of International-Great Northern.
- May 21.—President Samuel Rea of Pennsylvania subpoenaed to appear before Railroad Labor Board on May 28 to explain Pennsylvania's stand in refusing to deal with Brotherhood of Railway and Steamship Clerks in a wage hearing before the board.
- May 23.—Railroad Labor Board re-elected B. W. Hooper chairman and G. W. W. Hanger vice-chairman.
- May 25-26.—National Conference on Valuation of American Railroads, called by Senator La Follette, opened in Chicago.

#### JUNE

- June 2.—New York legislature passed law requiring all roads to abolish steam locomotives within New York City by January 1, 1926.
- June 11.—Broad Street station trainshed of Pennsylvania at Philadelphia, Pa., destroyed by fire.
- June 12.—Interstate Commerce Commission established Signal and Train Control Section.
- lished Signal and Train Control Section.

  June 14.—Moffet Tunnel Act providing for financing by the State of Colorado of six-mile tunnel through Continental Divide on line of Denver & Salt Lake held constitutional by United States Supreme Court.
- June 20-21.—Interstate Commerce Commission started Pullman surcharge hearings at Chicago.

  June 22.—Consolidation of Nickel Plate and Clover-leaf systems approved by Interstate Commerce
- leaf systems approved by Interstate Commerce Commission.

#### JULY

- July 12.—Temporary injunction against violence in strike of Federated Shop Crafts, granted in October, 1922, made permanent by United States District Court at Chicago.
- July 30.—Western roads declined to reduce freight rates on flour and wheat to Atlantic, Gulf and Pacific ports as requested by Omaha Chamber of Commerce and Omaha Grain Exchange.

#### AUGUST

- August 6.—T. H. Beacom appointed receiver for Denver & Rio Grande Western, succeeding J. H. Young, resigned.
- August 14.—Interstate Commerce Commission authorized construction of 175-mile line from Edgewood, Ill., to Paducah, Ky., by the Illinois Central.

#### SEPTEMBER

- September 11.—Interstate Commerce Commission made public its first final valuation reports on properties of San Pedro, Los Angeles & Salt Lake and Atlanta, Birmingham & Atlantic.
- September 20.—Change in system of rating coal mines for purpose of car distribution suggested by United States Coal Commission in report to President on remedy for irregular production.
- September 24-29.—Interstate Commerce Commission opened hearing on joint application of Louisville & Nashville and Atlantic Coast Line for authority to lease Carolina, Clinchfield & Ohio.
- September 27.—Chicago, Burlington & Quincy passenger train went through pile trestle, weakened by floods, near Lockett, Wyo., resulting in death of 31 people.

#### OCTOBER

- October 5.—Interstate Commerce Commission reopened investigation into rates, charges and practices governing transportation of anthracite coal.
- October 9.—Ralph Peters, president of Long Island Railroad, died at Garden City, L. I.
- October 11.—Judge Robert S. Lovett resigned as chairman of executive committee of the Union Pacific.
- October 11.—Interstate Commerce Commission ordered general investigation of rates on grain and grain products.
- October 16.—Railroad Labor Board granted increases in wages of from 1 to 2 cents an hour for clerical and station employees on 30 roads.

#### NOVEMBER

- November 3.—George R. Huntington, president of Minneapolis, St. Paul & Sault Ste. Marie, died at Minneapolis, Minn.
- November 6.—Fred Zimmerman, vice-president of Chicago, Indianapolis & Louisville, elected president of Cincinnati, Indianapolis & Western, succeeding B. A. Worthington, resigned.
- November 8.—Firemen and enginemen on Virginian called strike following discharge of 12 firemen and enginemen for refusal to accept motive power for service during shopmen's strike of 1922.
- November 14.—Interstate Commerce Commission opened hearing on freight rates on grain, grain products and hay at Kansas City, Mo.
- November 18.—George Chadbourne Taylor, president of American Railway Express Company, died at Pelham Heights, N. Y.
- November 23.—C. T. Jaffray elected president of Minneapolis, St. Paul & Sault Ste. Marie.
- November 26.—Railroad Labor Board ordered wage increases for telegraphers, telephone operators, station agents and agent telegraphers on 21 roads.
- November 26.—E. P. Morrow nominated for membership on Railroad Labor Board.

#### DECEMBER

December 1.—Samuel Rea, president of Pennsylvania, also elected president of Long Island Railroad.

December 3.—Interstate Commerce Commission prescribed general revision of express rate structure throughout the United States.

December 4.—Interstate Commerce Commission completed hearings on its tentative consolidation plan.

December 5.—Sir William Mackenzie, railway financier and member of executive committee of Canadian Railways' War Board, died.

December 6.—President Coolidge recommended railroad legislation in message to Congress.

December 8.—Labor Board upheld Virginian in discharge of two men in controversies with engine service employees which resulted in a strike on November 8 and ordered reinstatement of ten.

December 9.—Section of Twentieth Century Limited on New York Central collided with preceding section at Forsyth, N. Y., resulting in death of nine people and injury to five.

December 10.—Lord Shaughnessy, chairman of the Canadian Pacific, died at Montreal.

December 14.—Robert E. M. Cowie elected president of American Railway Express Company, succeeding George C. Taylor, deceased.

George C. Taylor, deceased.

December 17.—Interstate Commerce Commission approved installation of Chicago, Rock Island & Pacific automatic train control.

December 28.—Senate confirmed nomination of H. C. Hall, member of the Interstate Commerce Commission, as chairman of the commission during 1924, to succeed B. H. Meyer.

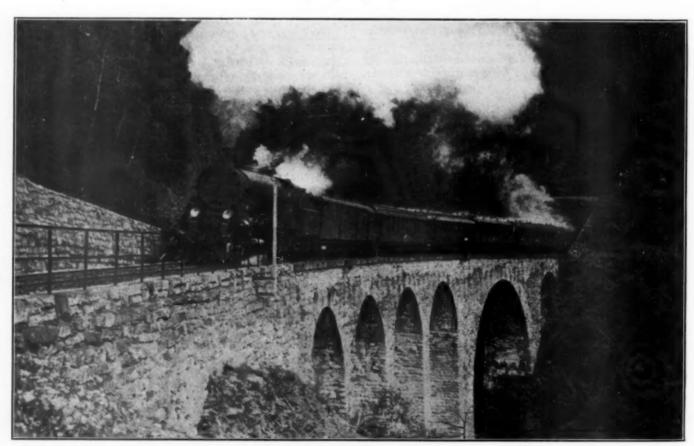
### Freight Car Loading

WASHINGTON, D. C.

REVENUE FREIGHT LOADING for the week ended December 22 amounted to 877,257 cars, an increase as compared with the corresponding week of 1922 of 50,945 cars and as compared with 1921 of 210,652 cars. All classes of commodities except grain and grain products and coke showed increases as compared with the previous year but especially large increases were shown in merchandise and miscellaneous freight. The summary as compiled by the Car Service Division of the American Railway Association follows:

REVENUE FRIGHT CAR LOADING Week Ended Saturday, December 22, 1923

Week Ended Saturda	ly, December	66, 1763	
Districts:	1923	1922	1921
Eastern	214,964	207,063	165,699
Allegheny	185,320	177,026	136,837
Pocahontas	39,878	28,425	25,970
Southern	130,156	122,770	106,080
North Western	111,177	103,472	78,896
Central Western	135,684	132,872	98,164
South Western	60,078	54,684	54,959
Total Western Districts	306,939	291,028	232,019
Commodities:			
Grain and grain products	47,482	50,744	37,113
Live stock	34,984	30,537	23,093
Coal	183,377	178,568	136,089
Coke	11,395	13,196	7,200
Forest products	66,997	58,416	45,077
Ore	10,749	9,130	5,593
Mdse, L. C. L	234,258	216,559	211,161
Miscellaneous	288,015	269,162	201,279
Total	877,257	826,312	666,605
December 15	899,522	879,052	726,074
December §	913,774	909,174	741,341
December 1	835,296	840,412	741,849
November 24	990,217	946,642	673,465
Cumulative loading for year to date	48,300,017	41,624,285	38,068,528



Express Passenger Train on Tauern Line-Austrian State Railways

## Foreign Railway Section

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The Contributors to the Foreign Section Britain, A Year of Consolidation France Likes Operation Under New Policy Italy Makes Big Reduction in Railway Deficit Belgium, Physical Reconstruction Complete Netherlands Railways Are Marking Time Danish Railways Increase Their Earnings Polish Railways Still Badly Handicapped Czechoslovak Railways Bring Down the Deficit Balkan Railway Problem Far from Solution Russian Railways Show Some Improvement Austria, Rigid Economy the Watch Word Germany and Some Other European Countries Egypt Jogging Along in the Railway Race South African Railways, Brighter Prospects for Turkey, Future of Railways in, Still in Doubt China's Lines Do Well Under Trying Conditions Japan and South Manchuria, The Railways of Australia, Conditions Generally Improved India's Railways Practicing Rigid Economy Argentina, A Good Year for the Railways

### The Contributors to the Foreign Section

Writers from All Over the World Review Railway Developments in Their Countries

On the third consecutive year in its Annual Review Number a comprehensive series of articles describing developments during the year on the railways of principal

foreign countries.

This section in this issue surpasses in size considerably those we have published heretofore and some additional countries have been included. We feel that a more up-todate and comprehensive description of the railways of the world as a whole as they are today could nowhere else be obtained. No claim to perfection, however, is made or implied. Contributions have to be solicited from all over the world, and this part of the task has to be begun late in the summer. To many places the mails are slow and uncertain and not infrequently a correspondent whom we feel we may count upon with confidence is unable at the last minute to prepare an article for us or to secure a substitute to do In such a case, which unfortunately occurred in connection with two or three important countries this year, there is generally nothing to be done but to omit entirely an article covering that country. This will explain the omission of several countries from this review which the reader will rightly think should be included.

On the other hand, there are a number of small countries important from a railway standpoint and whose situation should be of interest to the American and Canadian reader, concerning which space requirements will not permit us to go into detail each year-Switzerland for example. railways of that country are important, but they do not bulk large enough in world mileage or world traffic to allow us to allot to them space for a long article in each and every Annual Review Number. In this issue two years ago was published a comprehensive article about them. and this year we have had to content ourselves with a brief summary. Moreover, in some cases where we are dealing with a country not well known to Americans and about which no general descriptive material has been recently published, it is often necessary to allow more space for general description than would otherwise be the case-because it is our aim that these articles should be narrative of recent develop-

ments rather than merely descriptive.

Criticism and suggestions are invited. If an article has been omitted on some country which the reader feels should have been included, the chances are that the reason is that we have not been able to find anyone competent and willing to write such an article for us. The critical reader might be able to offer us some very valuable suggestions for overcoming this situation.

Meantime, the reader will recognize the names of some of our correspondents as old "standbys" who for this issue, as in the past, have presented the developments in their own countries comprehensively and with a full appreciation for

the viewpoint of the American reader.

W. H. Fraser, who, because of his previous contributions, needs no introduction to our readers, has written on "A Year of Consolidation in Britain," a subject which should be of the greatest interest to those in this country who would like to profit by England's experience in solving the consolidation problem of the railways in this country.

Gilbert E. Chittenden, who tells us of the improved conditions which the year has brought in South Africa, likewise is known to our readers. Mr. Chittenden is on the staff of the general manager of the South African Railways.

M. Peschaud, who describes the interesting developments

of the past year in France, has contributed to the *Railway* Age for a number of years. Mr. Peschaud is secretary of the Paris-Orleans Railway.

A. Niklitchek, an Austrian mechanical engineer specializing in locomotive work and who tells of the important change made in the administration of the Austrian State Railways under the auspices of the League of Nations, is likewise known to our readers, not alone for his writing but also for the excellent photographs, taken by himself, which he sends for purposes of illustration. Canadian readers will be interested in the similarity of the new non-political organization of the Austrian State Railways to that of the government-owned lines in Canada. The article called "Czechoslovak Railways Bring Down the Deficit," by Dr. Vaclav Partl of the Ministry of Railways of Czechoslovakia, also says that a similar plan for railways reorganization has been authorized in his country.

C. H. Newman, publicity officer of the New South Wales Government Railways, in this issue of the Annual Review Number as in the last, presents a vivid and comprehensive

picture of the year's developments in Australia.

Prince Lazarovich-Hrebelianovich, who tells why the Balkan railway problem, particularly that of Jugoslavia, is far from solution, is a Serb nobleman, residing temporarily in New York but in constant communication with his homeland, which is now a part of the Kingdom of the Serbs, Croats and Slovenes.

Sidney Brooks, who was formerly a special engineer for the Baltimore & Ohio and who served with the American Relief Administration in Russia, has presented what is probably as clear a picture of the sad state of the Russian railways under the Soviet regime as it would be possible to give.

A. Vahid Bey is a Turkish naval officer, with a long experience as a journalist, diplomat and business man. Because of his account of the effect that the supposed failure of the Chester concession has had on the reputation of business concerns of this continent in Turkey, his article is probably one of the most timely in the whole section.

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C. K. Huston, who tells how Egypt is "jogging along in the railway race," is an American and a graduate of the University of Iowa. At present he is instructor in English

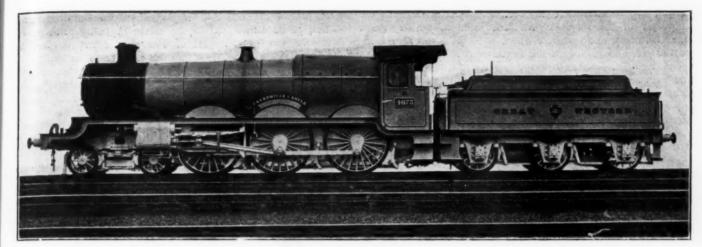
at the American University in Cairo, Egypt.

Colonel E. A. Simmons, president of the Simmons-Board-man Publishing Company, publishers of the Railway Age, who tells of conditions in Japan, Chosen and South Manchuria, naturally needs no introduction to readers of this paper. Colonel Simmons spent several months in the Orient during the past year.

A. Giordano, our regular correspondent in Italy, tells of the accomplishment of the Italian government in reducing the huge deficits of the state-owned lines in that country.

G. M. Oehm, A. Blichfeldt, C. Schotel, R. H. Sheffield and M. T. Meadows, who have described conditions in Poland, Denmark, the Netherlands, Belgium and Argentina respectively, are the correspondents of the American Trade Press in those countries.

Our correspondents in India and China must, for adequate reasons, continue to remain anonymous. Both of them, however, are in the closest touch with railway affairs in their respective countries and, moreover, they are quite familiar with railroading on this continent and can write with due appreciation for the American point of view, which makes their contributions among the most interesting in the entire foreign section.



One of Ten Built by the Great Western at its Swindon Shops-Tractive Effort, 31,626 lb

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### A Year of Consolidation in Britain

Amalgamation into Four Large Systems Apparently a Success—Railways Prospering

By W. H. Fraser

THE YEAR 1923 has been unique in the history of British railways, and in view of the proposals for consolidation in the United States it should be of special interest to American railway men. On January 1, 1923, 120 railways were merged into four large systems, and the new regime is now fairly launched on its way, in the language of the Railways Act of 1921, "towards the more efficient and economical working of the railway systems of Great Britain." With these sweeping changes, traditions have been largely broken down and previous railway statutes repealed by the dozen. So far, there is every indication that Sir Eric Geddes, the former Minister of Transport, was justified in introducing the Railways Act of 1921 as being the only solution to the difficulties of the railways, which had arisen through government control. Consolidation has materially strengthened the credit of the industry and has given much needed stability at a most critical time.

### Officers Displaced by Consolidations Indemnified for Loss of Positions

To the public, the great changes that have been introduced into British railway practice have been almost imperceptible. For the headquarters and divisional staffs the task of welding the numerous systems into four groups has been stupendous and has involved many changes in the personnel. Instead of some hundreds of directors there are now 102. Four general managers, "the Big Four" as they are familiarly called, are now responsible for the management. Other general managers whose names were household words and who had spent their lives in building up the railway systems, have passed into honorable retirement. Both on the small and large railways chief officers by the score have disappeared from the active list, the grouping scheme having affected the higher ranks more seriously than the lower grades. No railway man has suffered financially, however, since Parliament inserted compensation clauses in the Railways Act which give ample protection to anyone displaced, from the lampman to the executive officer. But consolidation has ruined the chances of many an ambitious railway man who had almost

grasped one of the chief prizes which the railway service has to offer.

#### Strong Roads Improve Conditions

#### on Weak Lines Absorbed

The financial strength of the big lines has already enabled them to make substantial progress in overhauling the equipment of the weaker railways absorbed. Lack of capital has hitherto retarded development on subsidiary lines, but the improvements to stations, buildings and roadway now being undertaken have demonstrated to the public that consolidation has heralded a greater prosperity to those districts which had suffered through inferior transport facilities.

In one respect, however, Sir Eric Geddes' forecast of results has already proved to be incorrect. By the Railways Act he hoped to eliminate competition, but it is as sharp and keen as ever it was. Competition between the present large systems has replaced that of the individual railways. Consolidation was effected on a territorial basis, presumably noncompetitive, but there is some overlapping of territories. The London, Midland & Scottish, for example, formed by the amalgamation of the London & North Western, the Midland and other railways, and which is supposed to be the railway in North Western territory, nevertheless reaches the South Coast over the line of a joint railway owned by it and the Southern Railway, which latter, speaking generally, has a monopoly in the South. Another long arm of the L. M. & S. is thrust out into the territory of the London & North Eastern and reaches the East Coast. From the North a main line of the L. M. & S. runs through the heart of Wales to the port of Swansea in the South West and is one of the principal areas of activity of the Great Western Railway. Other groups have similar opportunities of competition. The competition is not wasteful, but on the other hand it makes for rivalry in improving facilities to the advantage of the public and the more efficient working of the railways.

Some of the immediate advantages of consolidation are to be seen in the improvement of facilities to the public, particularly on long journeys. Both in the passenger and

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freight departments there has been a distinct advance in the character of the services provided, some of which would have certainly not matured where a large number of companies were concerned in the negotiations. There has been a linking up of services to secure easier and quicker travel and the provision of more through passenger cars has removed congestion at junction stations. The fullest use is being made of the opportunities afforded by the pooling of the rolling stock within the groups and it is not an uncommon sight to see trains leaving London stations bearing the names and arms of three or four companies.

#### Railway Shop Towns Fear

#### Centralization of Repair Facilities

Locomotive and car works and engineering department shops are widely scattered over Great Britain, individual railway companies of any magnitude having had their own estab-



Unloading a Car of Potter's Clay in Cornwall

lishments. The way to economy lies in the centralization of these works and the possibilities in this direction have given rise to considerable apprehension in the towns affected. Schemes of concentration will cause considerable opposition in local circles, as the transfer of bodies of workmen will be prejudicial to local trading interests. The problem is a difficult one and there is no indication that the present arrangements are being disturbed.

Table 1 gives a comparison of the groups as to size, and traffic, for the month of June, 1923, the passenger train journeys excluding season ticket holders.

	TABLE	1	
	Track Miles Including Sidings	Originating Passenger Train Journeys	Freight Train Traffic Net Ton-Miles*
Great Western London & North Eastern	17,239	9,661,698 19,439,814	278,436,603 518,372,544 617,021,299
London, Midland & Scottish		29,408,100 15,918,512	69,690,868

\*English tons are long tons of 2,240 lb.

A number of railways which were not included in the consolidation provisions of the Railways Act are still outside the groups. They comprise the Metropolitan District and London Electric Railways, under the direction of Lord Ashfield; the Metropolitan Railway, the Mersey, the Liverpool Overhead and a few light railways.

#### Heavy Expenditures for Improvements

From 1914 until 1923 capital expenditure in developing the railways was negligible, the war arresting all progress in this direction. During 1922 plans for new work that had been in abeyance were reconsidered and at the close of the year the railway managers, in conference with cabinet ministers, agreed to help in the relief of unemployment by pressing forward work that was urgently required by the companies. To set the wheels of industry going large orders for materials

were placed at once and improvements in buildings and station yards authorized to the extent of many millions of pounds. The greater part of 1923 has been occupied in the preparation of detailed plans and contracts for the larger projects and the work which has been commenced is now giving employment to large numbers of men all over the coun-In response to a further appeal from the government, additional schemes have been authorized by the four groups to the extent of £50,000,000 (\$243,000,000 at the normal rate of exchange), although this expenditure will be spread over at least three years. An analysis of the proposals reveals that immediate orders are to be placed for steamships, locomotives, cars, rails, track renewal, bridgework, new lines and a variety of improvements to the permanent way and works. A novel suggestion has been made to the government by the Great Western Railway, which has expressed its readiness to construct extensive new railways to relieve unemployment if the state is prepared to make a contribution towards the expense. The request is based on the fact that new lines are not likely to be remunerative for many years. Large extensions of London electric and suburban lines are in hand, the government having guaranteed interest on the capital expenditure under the Trades Facilities Act.

#### "Nailing the Lies"

American railway men have had their full share of unfair criticism from the public and the press, and can realize its injurious effects. British railways have been going through the same ordeal. In late years they have never been free from harmful and unmerited criticism, but in the year that has just closed the campaign of misrepresentation has exceeded all previous experiences. Any arm-chair critic has only to put pen to paper and is hailed as an authority on transport matters. Since the war there has been an abnormal growth of publicity bureaus attached to trade organizations. These publicity bureau managers find their best targets in the railways, owing to the readiness with which propaganda against the carriers is accepted. It would almost appear that the



Excavating for a New Engine Yard, King's Cross Station, London

motto of the press is to "blame always, praise never." The most astounding misstatements are accepted for publication and swallowed by a gullible public with avidity, which has led to a growing impression that the railways are behaving unfairly in their relations with the public.

The whole trouble is due to the amazing ignorance of the press and public on railway methods. In pre-war days the railways allowed adverse criticism to go unchallenged and the hoary legends of a half-a-century ago have today become ons of

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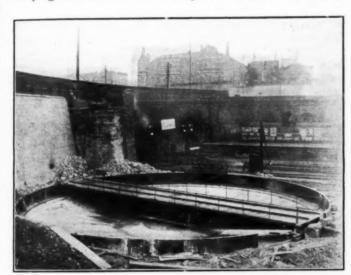
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deeply-rooted beliefs. The managements are fully alive to the dangers attending the propaganda launched against the railways and have for some considerable time taken steps to counteract it. It is a healthy sign when railway directors and general managers enter the lists in defense of the railways, a thing unheard of a few years ago. The English press can be quite fair if it is supplied with authenticated facts and in this way only can the railways hope to "nail the lies."

#### Rates and Fares

Passenger fares were reduced from 75 per cent above prewar to 50 per cent on January 1 with corresponding reductions on reduced-rate tickets. The revised basic rates per mile for single tickets are: First class,  $2\frac{1}{2}$ d. (5 cents); second, 2d. (4 cents); third,  $1\frac{1}{2}$ d. (3 cents). Round-trip fares are double the single. Second-class accommodation is disappearing and now exists, for the most part, only in London suburban areas. It was totally abolished on July 1 on the South Wales railways absorbed by the Great Western. Varying reductions in rates for parcels and other traffic by



Installing New 70-ft. Turntable at King's Cross Station, London

passenger trains were made during the year. The price of season tickets (50 per cent over pre-war) has been the subject of bitter attacks in the press, although no railway traveler receives more favorable treatment than the season ticket holder. As a result of agitation the question is to come before the Railway Rates Tribunal. Merchandise rates dropped in August from 60 per cent over pre-war to 50 per cent and the post-war cartage increases were abolished. The cartage rates are important to the British railways since, as is generally known, store-door collection and delivery is everywhere maintained by the railways.

#### Reclassification of Freight Now Mooted

As required by the Railways Act of 1921, the new schedules of standard freight charges were deposited in the summer and the Rates Tribunal will shortly begin to hear the views of the railways and traders. The proposals are that there shall be 21 classes instead of 8. All exceptional rates (i. e., generally speaking, low rates made between certain points to meet water competition, etc.) which are 5 per cent below standard rates will automatically cease to exist. Under the Act the system of maximum rates will also disappear. The traders co-ordinating committee which has been sitting with the railway representatives has done good work in settling voluminous details which would otherwise have been referred to the Tribunal. It will probably be a long time before these new schedules are settled. It is expected that

two years will be occupied in the hearing. The reason for the revision is broadly in order to insure that the companies shall secure the same revenue as in 1913 with an additional sum sufficient to pay interest on capital expenditure since 1913 and an allowance not exceeding 33 1/3 per cent on economies effected by consolidation. After the "appointed day" when the proposed rate schedules go into effect 80 per cent of the surplus income above the standard revenue is to be applied to the reduction of rates and fares. If the net revenue falls short of the standard revenue the Rates Tribunal must order rates and fares to be advanced.

#### Labor Situation Still Favorable

In the ranks the year has passed in unbroken peace. At intervals sporadic attempts have been made by a few malcontents to create the impression that a "crisis" was imminent, but their efforts have failed ignominiously. At the annual congress of the railwaymen's union the situation was summed up in a sentence by the president: "The railwaymen have been able to maintain their favorable position." The sliding scale of wages based on the cost of living is still in operation, but, food prices being fairly constant, only one reduction of 2s. (approximately 50 cents) per week has been made, i. e., in July, the first for 12 months. Few classes of employees were affected, since large numbers of them had already reached their base rates which are fixed at roughly 100 per cent over pre-war.

Rates of pay of several classes are given in Table 2.

TABLE 2

Weekly (48 Hours)	Rates of Jan. 1, 1923	Wages Existing Rates	Standard Rates
Enginemen (Class 6th year)	\$21.87 \$17.50	\$21.87 \$17.50	\$21.87 \$17.50
Engine Cleaners	\$10.69	\$10.21	\$10.21
Gangers (Rural)	\$13.12 \$12.39	\$12.64 \$11.91	\$11.66 \$10.45
Undermen	\$11.91 \$12.51	\$11.42 \$11.91	\$9.72 \$11.18

Note—Schillings and pence changed to American equivalents at par exchange.

#### Machinery for Mediation Works Well

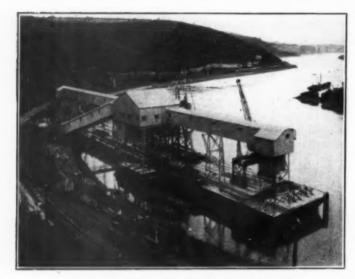
Discussions on conditions of service between the representatives of the men and the managements have been frequent, but the well-planned machinery of sectional councils and wages boards, provided by the Railways Act has so far provided settlements for all disputes. There have been two outstanding problems. The rivalry between the industrial union, represented by the National Union of Railwaymen, and the craft unions has prevented a revision of the pay and service conditions of shop employees who under the Railways Act are outside the jurisdiction of the Wages Board. All attempts to placate the conflicting interests and bring the parties to an arbitration court have so far failed.

The second and larger issue is concerned with the modification of the working conditions, popularly called "the trimmings." The proposals of the companies are that some of the post-war concessions made under government control should be partly withdrawn. The final stage in the negotiations was reached in November when the question was referred to the National Wages Board. The terms of reference include revision of payment for night and Sunday duty and payment to enginemen on mileage basis. There is no proposal to interfere with the basic rates of railway wages or the principle of the eight-hour day. The railway companies' object is to secure savings in expenditure to pay for part of the successive rates reductions. If the application is granted in its entirety the wage bill of the railways will be reduced by about \$19,440,000\* per annum.

The last census of railway employees gives a total of 681,778, compared with 676,802 in 1922. The total staff in 1913 was 614,496. The large increase is due to the introduction of the eight-hour day.

#### Financial Prospects Encouraging

The financial prospects of 1923, despite the reductions in rates and fares and poor business conditions are considered to be good. In 1921, 7½ months of which were spent under government control, there was a net loss on railway operations of nearly \$43,700,000.\* By the end of 1922 the companies had recovered their financial equilibrium, the final accounts showing net receipts of \$216,203,666. Miscellaneous receipts, including \$5,602,487 taken from reserves, raised the total net revenue to \$264,955,716. Interest and dividends paid increased from an average of 4.32 to an average of 4.62 per cent. Expenditure was reduced by about \$252,000,000 during 1922 and further savings are estimated to increase this figure during 1923 to \$364,500,000. The full effect of rate reductions will be felt in 1923, but so far



A Dock for Unloading China Clay, Cornwall

the companies, with one exception; are not publishing comparative figures.

The effect of rate reductions is revealed in the government statistics for the month of June which show, as compared with 1922, an increase of 1,695,851 (1.66 per cent) in passengers carried and a decrease in receipts of \$5,609,845 or 16.42 per cent. The July figures show similar results except that the money loss was reduced to 9 per cent. Freight train tonnage during the same selected period increased by 7½ million long tons (34 per cent)—in money \$1,244,894 or 2.88 per cent. In July the tonnage increased by 9.60 per cent and the receipts decreased by 10 per cent.

Table 3 gives a comparison of the receipts and expenditure on railway operation for the pre-war year 1913, the year 1921, during which there were 7½ months of government control, and 1922, the first full year after the return of the railways to private ownership. It excludes the figures for docks, harbors, wharves, hotels, steamboats, etc.

TABLE 3

Receipts	and Expenditure of		
	Total expenditure	Gross receipts	Net receipts
1913	\$367,922,995	\$582,268,192	\$214,345,197
1921	1,102,089,856	1,058,493,376	D. 43,596,480
1922	849,743,502	1,065,947,168	216,203,666

Railway reserve funds at the beginning of 1923 stood at \$617,220,000, including the \$291,600,000 paid by the government in discharge of the railway companies' war claims. The reserves compare with \$97,200,000 in 1913. The large increase in the railway reserves evoked a flood of comment in

the press which sought to compel the railways to use their money for capital improvements and the relief of unemployment. Critics were blind to the fact that the Railways Act decreed otherwise and specifically mentioned that the railways were among other things to use the moneys "as a reserve fund for meeting contingencies." It is not too much to say that if it were not for these reserve funds the shippers and the public would have fared badly in the reduction of rates and fares.

Any general comparison with railway stocks and shares before and after consolidation would be futile as, for the most part, there has been a complete change in their character. Dealings in Great Western securities afford the only reliable guide, as that company has merely enlarged its capital by consolidation, no large companies having been added to it in the process. The figures, which are for £100 (\$486) consolidated ordinary stocks, provide an interesting commentary in the relative prosperity of railways under government control and after.

TABLE 4	£.
1913 (Highest)	11936
January 1921 (71/2 months before govt. control ended)	763/
January 1922 (41/2 months after govt. control ended)	751/2
January 1923	110%
October 1923	1113/

\*These figures are given in pounds, since to change them to dollars would destroy the percentage form in which they now appear.

#### Competition with Motor Vehicles

The railways continue to hold their own with road transport despite its formidable competition. In 1922 passenger journeys numbered 1,748,956,116, a decrease of 2.11 per cent. compared with the previous year, but an increase of 12.85 per cent over 1913. The total tonnage of minerals and general merchandise carried in 1922 was 302 million long tons (338.24 American tons), an increase of 84 million long tons (38.44 per cent) over 1921. The increased tonnage was largely due to greater activity in the mining industry. Railway-owned canals showed a slight increase in 1922 in the tonnage carried, 1,686,514 long tons, but there was a net loss of \$908,820 in their operation in addition to interest on capital. British traders systematically shun canals and the outlook is distinctly unpromising, although strenuous efforts have been made by politicians to revive interest in the century-old controversy over the merits of railway and canal transport respectively.

#### Only Five Persons Killed in Train Accidents

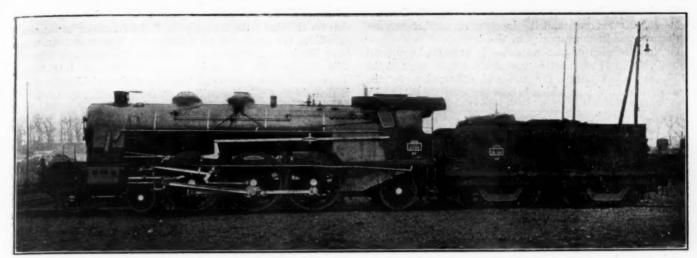
The railway accident returns for 1922 revealed that five passengers were killed (one in 300 millions carried) in actual train accidents and the public was much impressed with the figures when compared with the accident statistics for the American roads on which 106 passengers lost their lives in train accidents.

Irish railways are moving toward better times under the new conditions. The tendencies are towards consolidation, the Irish Free State Government having prepared an amalgamation scheme. It is expected that ultimately the railways in the Irish Free State will be nationalized.

AT CHATTANOOGA, TENN., the federal grand jury has found an indictment against the Tennessee Central on charges of violating the federal law by discrimination in the prices charged for the transportation of steel rails.

THE KANSAS CITY, MEXICO & ORIENT paid its Kansas taxes on December 20 and preparations are being made to meet the Oklahoma as well as the Texas taxes when they fall due on December 31. This is the first time in several years that the road has been able to meet its taxes.

<sup>\*</sup>This and other monetary figures are given in American money at par of exchange, i. e. £1  $\equiv$  \$4.86. As a matter of fact the pound is now bringing only about \$4.40, but this does not betoken a corresponding decrease in purchasing power within the British Isles.



Standard Pacific for Heavy Passenger Service on the P. L. M.

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### France Likes Operation Under New Policy

Systems Accustoming Themselves to Act of 1921 and Approach Normal Operation

By M. Peschaud

The RAILWAYS of France are adapting themselves to the new organization under the Railways Act of 1921 and are approaching again normal conditions after about ten years of war and post-war readjustment. The mileage of the French railways changed little in 1923, remaining at about 26,000 miles, divided among five private companies (viz., the Eastern, the Southern, the Northern, the Paris-Lyons & Mediterranean, and the Paris-Orleans, with a total mileage of 19,000) and two lines owned by the government (the State with 5,600 miles and the Alsace-Lorraine with 1,400 miles).

#### Many Improvements

The French railways have, during the year, as a result of strenuous efforts, finished repairing the damage caused by the war and, moreover, have begun the improvements which they planned a year ago. Audible signals in locomotive cabs to repeat the visible indications of block signals are in course of application on all the systems. Telephone dispatching is being extended more and more. The railways have practically restored the speed which characterized their passenger service in 1914. The former schedules of local and slow trains have been restored without great difficulty. The Northern Railway has placed in service a non-stop train between Paris and Brussels which makes the journey of 192.7 miles in 3 hours and 45 minutes (51 m.p.h.). The Paris-Calais service is scheduled at 53.3 miles an hour (58.9 in 1914); Paris-Lille at 55.2 (58.3 in 1914).

The substitution of electricity for gas in passenger car lighting is making good progress on all the railways, except the Paris-Orleans which already had electric lighting. The State Railway is equipping 50 cars a month for electric lighting and the Paris, Lyons & Mediterranean, 100 a month. On the Eastern, electric lighting of cars will be completely installed by January 1, 1924. Taken all together it can be said definitely that every express train on all the railways will be lighted by electricity by that date.

Certain other improvements have been made, such as the installation of electric lighting in a number of stations, the

lengthening of platforms to accommodate the longer express trains, etc. Several railways have installed in certain stations apparatus to receive time signals by wireless telegraphy, in order to provide a standard for more accurate timing of trains over their lines.

The railways have studied closely the question of continuous brakes for freight trains. The question was of prime importance from the point of view of international commerce since Germany had hastened to equip its own rolling stock with a German brake contrary to the provisions of

### Big Increase in Rolling Stock and Motive Power STANDARD GAGE LOCOMOTIVES ON LINE

Railway		Jan. 1, 1914	Increase, Per cent
Alsace-Lorraine	1.822	1,159	57
Northern	3,076	2,350	30
Eastern	2,482	1,899	31
Paris. Lyons & Mediterranean	5,114	3,560	44
Paris-Orleans	2,857	2,105	36
Southern		1,061	15
State		2,869	48
Total	20,8151	15,003	39

 $^{1}\,\mathrm{T_{0}}$  this figure should be added 41 electric locomotives and 104 motor cars.

Article 370 of the Treaty of Versailles. The technical commission of the Superior Railway Council (the highest railway authority in France) recommended on behalf of the French government the adoption for international freight train service of the Westinghouse brake with the type L triple valve and the removable container valve. The international commission meeting in Paris in October adopted the Westinghouse air-brake especially designed for European rolling stock.

The supply of rolling stock which has been completely reconditioned since the Armistice is sufficient for the needs of traffic.

Attention should be called to the fact that while the total of locomotives has been increased 39 per cent over pre-war conditions, the increase in tractive power is considerably greater.

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The increase in the tonnage carrying capacity is even greater by 20 per cent than the increase in number because of the increase in the capacity of the new cars.

The total number of passenger cars is 28,668 as compared with 30,916 in 1914, but this does not take into account the 5,139 cars taken during the war and delivered under the terms of the Armistice, which brings the total up to 33,807.

	FREIGHT	CARS	ON LINE		Increase
Railway Alsace-Lorraine			Jan. 1, 1924 45,730	Jan. 1, 1914 29,628	Per cent
Northern			91,340	81,029	13
Eastern			74,860 120,085	60,734 105,568	13 23 14 5 27 32
Southern			31,628	30,107	5
Paris-Orleans State			58,823 81,498	46,237 61,606	27
State			01,490	61,000	
Total			1,503,9641	414,907	21

<sup>3</sup>To this figure should be added 29,874 caboose and work cars.

The increase in carrying capacity is even more important, since the new cars which have been placed in service have replaced types of lower seating capacity which did not at all meet the demands of service and the replacing of which has been a decided improvement.

Monthly statistics of car loading for all the systems including that of Alsace-Lorraine show the following progress:

AVERAGE	DAILY	FREIGHT	CAR	LOADING	BY	Months
		(in The	ousan	ds)		

		1922 1923
January		45.5 55.
February	 	47.6 54.4
March	 	49.6 56.9
April	 	46.7 54.9
May	 	49. 54.2
June	 	49.5 56.7
July	 	50. 55.1
		50.9 55.
September		54.4 59.

In order to increase the consumption of sea-food in the interior of the country, the railways have inaugurated "fish weeks" at various places, including Boulogne and at Strasbourg, and by the installation of refrigerator equipment have shown to the French public that they are adequately equipped to furnish perfectly fresh fish at any distance from the seaboard. Regular fish trains from the Atlantic seaboard are operated as far distant as Naples where their cargoes arrive in the best condition. Express fish trains have been placed in service on the Northern and the Paris-Orleans.

#### Electrification

The electrification which was begun in 1922, as was pointed out in the writer's review of the railway situation in France published in the Annual Review Number of the Railway Age last year has made good progress. The decree issued on March 17, 1923, declared as urgent the work necessary for the electrification of the lines from Paris to Orleans and Vierzon. The construction of 80 motor cars and 200 electric locomotives ordered by the Paris-Orleans in 1922 is progressing normally. The Paris, Lyons & Mediterranean has decided to purchase its supply of electric power from private power companies. On the Southern Railway transmission lines of 150,000 volts capacity have been completed.

#### New Lines

Although no new line was opened to service in 1923, construction work is nevertheless going ahead. On the Eastern Railway the project for piercing the Vosges mountains and uniting its lines with those of the Alsace-Lorraine Railway, is being carried forward. Four such connections are projected. The one farthest north, from St. Dié to Saales, and the one farthest south, from St. Maurice to Wesserling, have been declared to be necessities and the Superior Railway Council has made a favorable report on the two projects which lie between them. On the P. L. M. work on the line

from Monéteau to St. Florentin will be completed in 1925; that on the line from Nice to the Italian frontier at Sospen in 1926. On the Southern Railway the Transpyrenean line from Toulouse to Barcelona by Aix-les-Thermes and Ripoll will represent in comparison with the present line from Toulouse to Barcelona via Cèrbere, a saving of 66 miles. It is thought that this line will be placed in service in 1926.

#### Operating Results

At the end of 1922 the companies showed some improvements in their operating results but the estimate of 1923 operations gives evidence of a slight increase in the total

					ng Reas	SULTS rancs*)	,			
			1922				1923	(Estima	ated)	
Alsace-	Keceipts	Expenses	Interest	Dividends	Deficits	Receipts	Expenses	Interest	Dividends	20 Deficits
Lorraine		****	****	***		520	509	49	12	50
Eastern State	1,037	848 1,194	166 217	30 13	382	1,037	889 1,257	178 285	25 12	460
Southern	443	457	129	13	156	466	453	140	12	460 139
Northern	1,158	1,050	180	46	119	1,225	1,150	220	43	188
PO.	941	911	227	40	237	998	936	243	34	215
P., L. M.	1,806	1,598	404	47	244	1,953	1,665	423	55	186
Total	6,426	6,058	1,323	189	1,147	7,293	6,849	1,539	193	1,294

\*Owing to the decline in the exchange value of the franc, no attempt has been made to give these figures in dollars. The par value of the franc is 19.3 cents; it now brings a little over 5 cents. The decline of its purchasing power within the borders of France has not, however, been so pronounced.

deficit, after the payment of interest and dividends (which is guaranteed by the government).

is guaranteed by the government).

The increase in the deficit in 1923 is due to increasing expenses caused by higher prices for materials, which bore the index number of 330 as compared with 100 in 1914. The increase in weekly receipts, however, by all the railways, including the Alsace-Lorraine, is continuing.

#### Rates

The Superior Railway Council has ratified almost unanimously the proposal to continue the general rate increase (from 70 to 80 per cent according to class for passenger traffic and about 210 per cent for freight). Consequently, by a decree issued on April 25, 1923, the Minister of Public Works prorogued until May 1, 1924, the temporary increase provided for in laws passed on February 14, 1920, and December 31 of the same year.

On the other hand, the revision of base rates on freight

AVERAG	E		١	N	E	E	R	I	. 3	r		K	1	:0	I	CE	P	T	S OF ALL	RAILWAYS
					(i	I	1	7	M	li	11	i	01	n	8		0	f	Francs)	
																			1922	1923
January																			114	121
February					9														117	124
March .																			120	132
April					0	0			0	0	0	۰	0					0	125	131
May					0		0	0		0					٠				123	133
June		0			9			0	w			0					0		126	137
July					0	0		۰				0					0		131	140
August .																			128	146
Septembe	T			0															135	154
October		a				0		2		0				0	0		9		141	150

Note—In 1923, the total outstanding indebtedness of the five private companies reached a total of 3½ billion francs. On the other hand, the government had made advances of a billion to the State and the Alsace-Lorraine.

which was undertaken last year by the Railway Directing Committee and by the Superior Railway Council has been completed. A second revision undertaken immediately thereafter will be finished by the end of the year. Notable reductions have been agreed to by the railways for numerous commodities: Products of mines, construction materials and all articles of prime necessity. These reductions have brought

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about a decrease in receipts of about 100,000,000 francs. To what extent has this decrease been counterbalanced by an increase in traffic? It is difficult to say. Agricultural products in particular have been favored. Among the most interesting reductions which have been made by the railways because of its benefit to consumers is that on package freight of agricultural products, which was adopted by the Superior Railway Council in July. This reduction amounted to from 10 to 25 per cent according to weight and distance. Much less reasonable has been the reduction (happily temporary) in rates on wines and wine grapes, which was imposed on the railways by the government in spite of unfavorable reports formally presented on two occasions by the Superior Railway Council. This reduction, from about 20 to 35 per cent, applicable from September 5 to December 15, has caused a loss of about 30,000,000 francs to the railways without profiting the consumer in the slightest, retail prices having been



International

An American Electric Locomotive

doubled at the same time the rate reduction was put into effect.

Several improvements have been made for the advantage of the traveling public. In June the Railway Directing Committee informed the Minister of Public Works that, desirous of facilitating travel by cripples and discharged soldiers, the railways were disposed to set aside on all their suburban lines compartments reserved for such persons (who already enjoy under the law of October 29, 1921, rate reductions of almost 75 per cent). New privileges have likewise been accorded to large families, which in compliance with the same law enjoy a reduction in rates from 30 to 70 per cent, according to the number of children. The conditions of application of the law have been considerably enlarged.

The total number of employees has varied little during the past year. This total is 507,000 persons for all the railways including the Alsace-Lorraine; in other words, 12 employees per kilometer (19.3 per mile) operated. Wages amounted to 4,200,000,000 francs or 60 per cent of the total receipts. The average wage per employee is 8,200 francs (\$1,583 at par or about \$410 at current rates) and per operated kilometer, 102,000 francs (\$19,686 at par or about \$5,100 at current rates). The cost-of-living bonus alone added 335,000,000 francs to the total wage bill. Indeed, because of the sending of 13,000 employees into the Ruhr, the railways have in 1923 operated with a less numerous force than in 1922. They have been able to do it, thanks to the overtime work authorized by the decree of September 14, 1922, regarding the application of the eight-hour law.

The writer pointed out in his review last year that the Superior Railway Council had declared itself in favor of leasing the State Railway to a private operating company and had pledged itself to reorganize the property. Up to the present time the government has not carried this out.

#### Incorporation of the Alsace-Lorraine

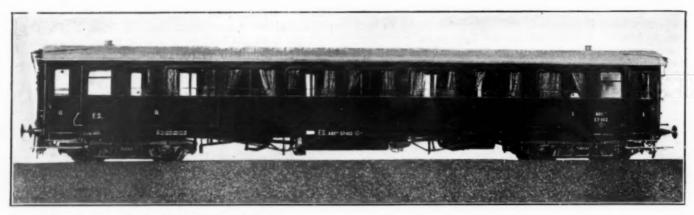
The Senate on March 20, 1923, voted to ratify the decree of November 30, 1920, relative to bringing the Alsace-Lorraine Railway under the control of the Minister of Public Works. The changing of operating methods of this railway to conform with those of the other French lines has progressed little by little, but the question of leasing the line to the Eastern Railway is still pending before Parliament. However, the commission from the Chamber of Deputies which had this matter under consideration has recommended the approval of the agreement entered into by the government and the Eastern Railway Company for the management of this line by the latter. Since the Alsace-Lorraine Railway has been added to those of France, the Railway Directing Committee has been increased by three representatives of this system.

After a considerable effort, which has been crowned with success, the French railways have been able to effect an organization for the railways in the Ruhr. On March 1, 1923, the Franco-Belgian Administration (Régie) was created. At the head of this administration is a French director, M. Breaud, assisted by two sub-directors, one French, the other Belgian, who have under their orders the railway managers who are acting as substitutes for the German managers at Essen, Ludwigshafen, Trêves and Aix-la-Chapelle. The personnel includes French, Belgian and German employees, which last are continually increasing in number. The French personnel is made up of employees from railway lines in country districts, by employees recruited from the different systems and by volunteers.

With a total of 16,000 employees for a system of 3,720 miles, where Germany had employed a working force of 18,000 men, the Franco-Belgian Régie has succeeded in organizing the transportation of fuel, in developing merchandise and passenger traffic and in holding down expenses in a satisfactory manner. The success of the Ruhr occupation is in a large part due to the good work of the Régie. Before this result was obtained it was necessary to force the German Minister of Transport, Oeser, to revoke the instructions for "passive resistance." An agreement reached on November 12 at Dusseldorf between M. Breaud and Councillor Wolff stipulates that the German administration shall put at the disposal of the Régie, 200 dump cars a day. In exchange, the Régie will deliver daily 400 box cars which it will take from the rolling stock seized in the occupied territory.

The result in the Ruhr is a credit to the professional qualities of French railwaymen, since the volunteers in the Ruhr have been chosen at random from all the systems. It is, in addition, a credit to the technical instruction which they have received in their original places of employment. It is a credit, moreover, to the devotion of the directors of the Régie, who have created from a disjointed organization in the face of the greatest difficulty a powerful organization with which today our adversaries have just joined forces. It is a credit finally to the French Minister of Public Works, M. Le Trocquer, who in many trips of inspection has followed and encouraged the work. His excellent understanding with the railway officers in France has decided the victory.

Finally, operations in 1923 mark the return of normal rail-way conditions in France and the new organization resulting from the agreement of 1921 is continuing to develop satisfactory conditions. From the point of view of traffic and receipts, the operation has been satisfactory. It has, indeed, been less satisfactory than that of the previous year because of the increase in expenses, especially expenses for coal and the heavy capital costs which weigh on the railways.



New All-Steel Passenger Car for the Italian State Railways

## Italy Makes Big Reduction in Railway Deficit

Savings Effected by Reducing Forces and Checking Fuel Waste—Slow Construction Progress

By Antonio Giordano

NE OF THE CHIEF CAUSES of the deficit in the budget of the Italian state since the armistice has been the critical financial situation of the Italian State Railways, and it can easily be understood why the attention of the government, which has undertaken seriously the problem of the economic reconstruction of the country, has been pri-

would want them and, if so, how much should be paid for

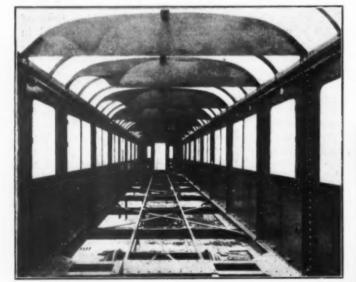
ownership. However, such transfer involved the settlement

of two problems, viz., whether or not any private concern

3,251,956,186 4,297,482,447 859,751,497 1,045,526,261 1,257,946.309 Deficit, Lire .....

\*Because of the depreciation in the value of the lire (normally 19.3 cents, now about 4.3 cents) no attempt has been made to give these figures in American currency. To obtain a general idea of values at par, divide these figures by five; at present exchange rates, divide by 20.

them. The practical impossibility of arriving at the solution for these problems led the government, itself, to undertake the reconstruction of the railways. The carrying out of this



Steel Frame of New Passenger Car for the Italian State Railways

marily directed to the Italian State Railway's troubles. The problem was complicated by the fact that railway revenues were showing a tendency to decrease in spite of higher rates, while expenses, particularly total wage payments, were increasing. It may be interesting to consider the following schedule relating to the financial situation of the Italian State Railways during the past few fiscal years, as shown in the table in the next column.

Under these circumstances it was no wonder that the government was more than willing to eliminate the deficit from the state budget by transferring the railways to private



Station at Genoa

decision involved efforts to cut down expenses and to in-

Amendments were immediately made to the regulations governing wage payments to absent employees with the following results: 131,659 persons were absent 1,691,294 days

during the first six months of 1922; during the same period in 1923, 76,205 persons were absent 874,815 days, a saving of about 50 per cent. Slow freight service has been almost totally suspended on Sundays without affecting service to the public, resulting in a reduction of 12,400 train-miles per week. During the first six months of 1922 there were 1,772,258 hours of switching service with a total of 16,434,-058 cars handled, while in the same period of 1923 17,238,-808 cars (an increase of 804,750) were handled in 1,688,809 hours (a reduction of 83,449). Notwithstanding an increase in the amount of freight carried and consequently in the number of cars handled, freight train-miles during the first half of 1923 totaled 14,920,274 as against 16,267,680 for the same period in 1922, a decrease of 1,347,406. Mileage per locomotive has also improved and the percentage of bad order cars has been reduced to 1.2 (in July, 1923) as against 4.2 in December, 1922, and 8 per cent in December, 1920. Before retrenchment was begun the total number of employees of the State Railways stood at 250,000. force has been reduced to 175,000, effecting a saving of 600,000,000 lire (about \$30,000,000 at the present rate of exchange), while at the same time more traffic has been handled. The full effect of the reductions in force will not, however, be felt for three or four years since all employees dismissed were paid indemnities for the loss of their

## Saving in Fuel and Lubricants

The inefficient use of fuel and lubricants was another condition which the government undertook to correct. Fuel consumption, which in the fiscal year 1913-14 averaged 104 lb. per thousand gross ton-miles, increased until in 1921-22 it averaged 157 lb., an increase of 51 per cent. The consumption of lubricants per locomotive-mile in the same period increased 134 per cent.

For the first half of 1923, however, the consumption of fuel has been reduced by 308,644 tons as compared to the corresponding period of the previous year, involving a saving of Lire 50,000,000, \$2,150,000 at present exchange rates)—calculating the price of the coal at Lire 204 (about \$8.75 per ton at present rates of exchange) and deducting fuel efficiency bonuses paid to enginemen. These figures show great progress in view of the increase in gross tonmiles from 20,515,084,743 in the first half of 1922 to 20,734,367,980 in the same period in 1923. It is thought that fuel saving may amount eventually to Lire 100,000,000 (about \$4,300,000 at present exchange rates) and savings in expenses for lubricants about Lire 10,000,000 (about \$400,000) as a result of bonus payments for fuel saving. It is, however, rather difficult to estimate the saving accurately, since Italy purchases most of her fuel from other countries over whose markets she has no control.

Wages also have been slightly reduced, particularly in the shops where these reductions average about 15 per cent. A reduction has also been made in the standard prices paid to outside concerns for repairs to cars and locomotives. Savings from this total about Lire 38,000,000 per annum (about \$1,634,000 at present exchange rates). Total reductions in expenses per annum therefore may be summarized as follows:

Wages Fuel and lubricants Maintenance of equipment Loss and damage payments, etc.	Lire Lire Lire	600,000,000 100,000,000 38,000,000 55,000,000
Total yearly reduction	Lire	793,000,000*

\*At current exchange rates this figure equals about \$34,100,000. The depreciation in purchasing power of the lire within the borders of Italy, however, is not nearly as great as its depreciation compared with the dollar (about 78 per cent).

# Increased Revenues

While expenses have been decreased, revenues have been increasing. From January 1 to July 31, 1923, 31,517,373 tons of freight were handled and 3,022,700 cars were loaded,

as against 27,024,286 tons handled and 2,598,115 cars loaded in the corresponding period of the previous year, showing an increase of 16.6 per cent in tonnage and 16.33 per cent in car loadings. Receipts during the first half of 1923 reached Lire 1,497,874,525 (\$64,408,605) as against Lire 1,373,323,212 (\$59,052,898) during the corresponding period of 1922 an increase of Lire 124,551,312 (\$5,355,707).

Revisions in passenger and freight rates are contemplated which should bring still higher receipts and the payment by the post office for the carriage of mails has been increased by some Lire 110,000,000 (about \$4,730,000).

The annual deficit will probably be reduced to about Lire



Corridor in New Italian Passenger Car

800,000,000 (\$34,400,000) or more than Lire 450,000,000 (\$19,350,000) less than for the previous fiscal year. With this improvement it does not seem an exaggeration to predict that by 1926 the deficit will have been wiped out completely.

# Construction of New Lines

The government's interest in the railways has not been confined entirely to financial matters. In addition several plans for new construction have been discussed or actually undertaken, among them four lines in the northern part of the country, some of which were planned for military purposes as far back as 1914. Three of these lines (Montebelluna to Susegana, Maiano to Udine and Sacile to Pinzano) are practically completed. On the fourth line (Vittorio Veneto to Ponte delle Alpi) much heavy construction is involved, and consequently the work progresses slowly. A total of Lire 85,000,000 (\$3,755,000) has already been spent in the construction of these lines and Lire 96,000,000 (\$4,128,000) will be required to complete the work. The lines from Vittorio Veneto to Ponte delle Alpi and from Sacile to Pinzano are important because of the improvement in service which they will provide between the port of Venice and its hinterland.

Another line of considerable military importance, that from Treviso to Ostiglia, through Piazzola and Legnago is under construction. Approximately Lire 65,000,000 (\$2,795,000) has been spent on this line already and a similar amount will be necessary to complete it.

Another project is the direct line from Bologna to Florence

which was begun in 1908 but never completed. This is a heavy traffic route and the new line is urgently needed. A considerable amount of work has been done on the line, but none of it is open to traffic. Work remaining to be done, however, will cost about Lire 600,000,000 (\$25,800,000) and the expenditure of such a sum in a short period of time would interfere with the government's determination to reduce the railway deficit. Accordingly, it is planned to go at the work gradually and for the current year but Lire 100,000,000 (\$4,300,000) has been authorized for this project.

Another new line (from Aulla to Lucca) has been partially opened to traffic. The total cost of this project is estimated at Lire 104,950,000 (\$4,512,850), of which Lire 40,000,000 (\$1,720,000) has been spent. Lastly, additional credits have been allotted with the view of accomplishing the "directissima" (i. e. cut-off) from Rome to Naples which has been partially completed. In the various committees of Parliament it has been emphasized that no new construction



Interior of a Compartment in New Italian Passenger Cars

should be undertaken until the work on the above-mentioned lines has been terminated and that construction should be continued at the present time only on lines of great importance or where the suspension of construction would be detrimental to work already undertaken.

# New Construction Needed

Under such circumstances, while the above-mentioned lines will likely be completed, it does not appear likely that the government will undertake any construction of new lines in spite of the fact that certain groups emphasize the necessity of some additional lines, among which may be mentioned the following:

- 1. A new short line from Fiume to Trieste which would reduce considerably the distance between Italy and Jugoslavia and thus improve the running time of the Simplon-Orient Express from Bordeaux to Constantinople.
- 2. A new line from Trieste to Austria and Czechoslovakia connecting the Adriatic with the two above-mentioned countries without touching Jugoslavia.
  - 3. Additional lines in Piedmont and in Sicily.

# Electrification

The problem of the electrification is again the object of examination in Italian railway and business circles, and in many quarters the question of whether electrification is advantageous or not has been raised. It is believed that the Italian State Railways Administration has resumed the preparation of the plans for the electrification of certain lines. The original program embraced 3,720 route miles. The former Supreme Board of the Italian State Railways had already approved the electrification of the line from Rome to Nettuno and from Rome to Tivoli. Electrification of the line from Pistoia to Poretta, which is the most important part of the line between Florence and Bologna, is expected to be completed by 1926 and the whole line by 1928. Work on the line between Genoa and Sestri Levante should be completed in 1924, and the line between Sestri Levante and La Spezia not much later.

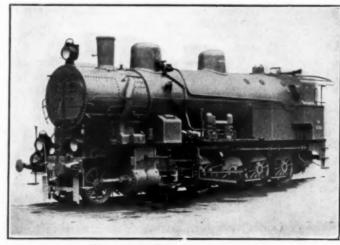
# New Equipment

The railways have adopted steel as the standard construction for passenger cars to be built in the future. This step was taken for purposes of providing greater safety as well as to obviate the difficulties experienced in securing suitable lumber at reasonable prices. These standard cars are equipped with end-doors and vestibules, two toilets, three first-class compartments and five second-class compartments, and can accommodate 18 first-class and 63 second-class passengers. The cars are 71 ft. 8 in. long and weigh, ready for service with storage batteries for lighting and full water reservoirs, about 45 tons.

A total of 150 cars of this type have been ordered by the Italian State Railways, divided among the following firms: The Officine Meccaniche and the S. A. Officine Elettro-Ferrvarie at Milan and the Societa Nazionale delle Officine di Savigliano and the Fiat Company at Turin.

# Opportunities for American Finance and Industry

In view of the desire shown in official circles to use Italian materials exclusively on the State Railways, there is not much opportunity for American supply manufacturers to develop business in Italy, although they could probably secure orders in connection with electrification if they would invest capital in this work. There might be some market for locomotives and cars for local and narrow-gage railways and tramways, which could be built up by acquiring financial interest in the construction of such lines. Special concessions in taxation are granted to foreign concerns which construct factories for the production of articles not already produced in quantity in Italy. Factories for the materials required for railway electrification come in this category.



An Austrian Freight Locomotive



A Rebuilt Railway Bridge in Belgium

# Physical Reconstruction Complete in Belgium

Operating Deficits Still Heavy, However—Public Opinion Demanding Business Methods

By R. H. Sheffield

THE OUTSTANDING FEATURES of the past year in Belgian railroad history are:

A start in reform tending to render railway administration more democratic and less trammelled by politics and government accountancy.

2. The completion of repairs of lines wrecked or damaged during the war.

3. Successful extension of the American dispatching system.

4. A strike of a few days which effectively held up the transport services of the country and in which the men failed to obtain the payroll increases for which they had struck.

The reduction of some of the loss on the previous year's operations.

 Announcement of further increases in rates during 1924.

## Private Companies Undisturbed

The figures given below show that nearly all the railways are owned by the government; the remainder belong to various companies with well-defined concession periods which will be allowed to run out naturally to their prescribed expiry date, as the government simply cannot afford to buy out these concessions in the present state of public impoverishment. These companies have all working arrangements as to rates, time schedules and other executive details with the government railway administration; their operations are carefully restricted, except in the case of the Northern of Belgium; but, sure in the possession of their respective monopolies for several years to come, they may be considered as fairly prosperous enterprises; and most of them pay steady, though small, dividends.

The ordinary standard gage lines of Belgium reach a total length of 3,187 miles, of which 2,970 miles, or 93 per cent, are operated by the government and 217 miles by various private companies, the most important of the latter being the Northern of Belgium, a subsidiary of the Northern of France. The narrow gage (1 meter) roads have a length of

2,686 miles and are controlled by the Vicinal Railway Company, a sort of semi-official organization under government control, which farms out some of the lines to local companies. There are about 50 miles of line per 100 square miles of territory or 7.76 miles of track per ten thousand of population.

Traffic over all standard gage lines was in 1922 as follows: Number of passenger-miles per mile of line, 1,185,800; number of ton-miles per mile of line, 628,054.

Extensive as they already are, the Belgian railroads are being further developed by double and multiple tracking, by constructing new lines in the industrial districts, and notably by the projected construction of quite a complete network of tracks in the new coalfields of Limburg, which are now being developed.

The international importance of the Belgian railroads is shown by the fact that three main European lines start from the government mailboat quay at Ostend, namely, Ostend-Basle; Ostend-Berlin-Warsaw; and Ostend-Vienna, with extensions to the Balkans and Constantinople. The Amsterdam-Paris expresses also cut right through Belgium; while international freight services run between Antwerp and Luxemburg, Switzerland, North Italy and the Rhineland.

#### No Electrification

The absence of powerful waterfalls or other natural forces would, say Belgian experts, make electrification of the railroads far too costly to be practicable at the present time. Generating stations would have to be built and maintained at an expense with coal as fuel which present railway revenue would not justify and there would not be a compensatory profit as against the present use of system traction.

### Dispatching System

A dispatching system, modeled after the American, was introduced some two years ago and has given such satisfaction that it is being gradually extended to the whole system.

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#### War Damage

Although, on paper, there had long been a plan for saving the government railroad rolling stock in case of invasion, the personnel were not sufficiently conversant with it to prevent the bulk of it falling into enemy hands when the German rush took place in 1914. With few exceptions, the stationary plant was left intact for the Germans to use; while the evacuation of the rolling stock into France was seriously hampered by the congestion on the French lines which were busily engaged bringing troops and munitions to the front. Of the 4,543 Belgian government locomotives, no fewer than 2,614 fell into German hands; the remaining 1,929 being evacuated and distributed over various French lines. Ninety per cent of the freight cars and 85 per cent of the passenger coaches also remained in occupied Belgium, where the Germans made full use of them. The Belgian railway administration "carried on" at Havre throughout the war; but thousands of railway employees remained in Belgium, where many of them rendered valuable aid to the



Corridor Leading to Platforms at Ghent Station

allied intelligence departments. Very few of the men took service under the Germans and most of these were dismissed for their pains when the Belgians returned after the armistice.

In their retreat, the Germans rendered useless most of the necessary stationery equipment in the west and southwest of the country; while most of the locomotives were rendered useless through overwork and lack of upkeep. Out of 2,110 locomotives inspected by the Interallied Commission for enforcing the terms of the armistice, only 350 or 16.2 per cent were reported as fit for service. The condition of the passenger coaches was about the same as the locomotives; while the freight cars had sustained less

Summarizing the railway situation at the armistice, it appears that at least one-third of the railway trackage had been entirely destroyed; that the other two-thirds was in such a state of neglect that every mile called for some sort of repair before it could be used; that the enginehouses and shops demanded extensive repairs and rearrangement; and that the signaling equipment, which, during the occupation, had been of a primitive kind, had to be entirely reconstituted. These things had to be done practically without tools; for most of the private engineering shops had been destroyed and the rest put out of action. The allied engineering services, together with the railroad personnel, set to work and achieved results. By April, 1919, a good third of the pre-war mileage was again in service for passenger trains; five months later 50 per cent of this passenger mileage was again in operation. The mileage run by freight trains

at these two dates, as compared with 1913, was respectively 43 per cent and 65 per cent. Ever since, work has gone steadily forward, so that today not only has the full prewar service been re-established but several extensions have been opened up during the past year.

# Enemy's Good Work

Whatever may have been their ultimate purpose in constructing it, the new line from Aix-la-Chapelle to Visé and Tongres, built by the Germans in the course of two years (February, 1915, to February, 1917), has proved of inestimable service to the Belgians since their return. This new road was projected by the Belgians considerably over half a century ago; but political influence, always a factor in Belgian railway affairs, prevented its realization until traffic necessities again revived it a few years before the war, which broke out before anything practical could be done.

The Germans had been in Belgium only four months when, realizing the strategic value of such a road linking up with their own lines at the eastern frontier of Belgium, they laid plans for the construction of a road the technical difficulties of which, too long for insertion here, are admitted by the heads of the Belgian Railway Administration to have been exceptionally formidable. These difficulties are mainly connected with tunnel and bridge construction, in the face of peculiar natural obstacles of ground, valley and The value of this new road was brought out when reparations in kind had to be brought into Belgium from Germany; and it was over this track that came the long, heavy freight trains bringing German coal, cattle and other reparation supplies to both Belgium and France. The line is also used today for the ordinary freight traffic to and from Germany-and very heavy this traffic is. For international traffic between Western Europe on the one hand, and Central Europe and the Near East on the other, this new road, when supplemented by a link between Tongres and Louvain, will become one of the first commercial roads in Europe.

## Narrow Gage War Destruction

A total of 1,023 miles of narrow gage road was either destroyed or put out of service during the war, with the result that, for all practical purposes, 683 miles of other narrow gage lines connecting or corresponding or otherwise involved with these, were also rendered useless. This means that 64 per cent of the narrow gage roads were inoperative when the Germans zetired. It should be remembered that, in an industrial country like Belgium, these narrow gage lines play quite as important a part in the economic scheme as the ordinary standard gage lines.

### Railway Administration

The Belgian Railway Administration is only now quitting its role of a mere government department and assuming that of a government-controlled industrial enterprise for which its operations fit it. As yet the step is but a timid one which involves the responsibility of the railway department for its own accounts and bookkeeping, instead of, as heretofore, leaving these to another government department, to wit, the Ministry of Finance. Belgian government railroads have no need to regulate their expenditure by their revenue; each year the Minister of Railways applies to Parliament for the credits necessary to meet his estimated expenditure for the coming year; these credits are voted from public moneys; the Finance Ministry settles the various accounts as they come along; revenue is credited to the government by the same ministry; and there the matter ends. Yet, ever since 1846, there have been proposals before Parliament for giving to the railway department an autonomous control over its own accounts.

During the war, a proposal was drafted for operating the

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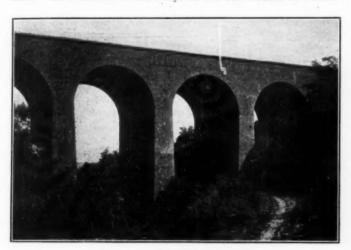
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railways through a "régie" (i.e. administration) under government control—this régie being a legally constituted monopoly approximating to the tobacco and match monopolies in France. That proposal was, however, turned down by the first post-war Minister of Railways who presented one of his own, which was shelved at the general election. The régie project has been revived during the past session (1923). Replies given in Parliament by the present minister show that expert opinion is favorable to the creation of an organization which, in the form of an autonomous régie, shall operate the railroads for government account. While waiting for that ultimate consummation, the department is studying the necessary changes to be made in the law and in the regulation and practice affecting accountancy in government departments.

Every one of the proposals for the industrialization of the government railroads vests executive power in political entities—the Minister of Railways or the two houses of Parlia-



A Reconstructed Belgian Viaduct

ment. None makes provision for a board of directors composed partly of government delegates and partly of delegates selected by large users of the railway—although this is the sort of régie control for which the business world of Belgium has been calling for years past.

# Demand to Model Government Lines After Organization of Private Enterprise

The traveling public and manufacturing users of the railway all over the country feel that separate accountancy or financial autonomy would not alone solve the problem. Separation of railway finance from government finance can, it is felt, only be effective if and when supplemented by practical industrial management.

"Cut out political influence and let the lines be controlled by a board of qualified business men, aided by government experts or delegates, and then, and then only, shall we be able to make the railway a permanently paying concern by eliminating useless expense," said the director of one of the largest companies using the railways. "If, as these various proposals provide, a régie is set up under parliamentary auspices, the board of directors chosen by the government will probably be political friends of the party in power; so that, instead of having only one politician—the minister—at the head of our railways, we shall have a dozen!"

If these views are sound, it seems rather strange that none of the farmers of industrialization projects have dreamed of setting up a controlling organism corresponding to the National Vicinal Company above alluded to, which is to all intents and purposes a régie, and which operates the narrow gage lines of Belgium with generally satisfactory results.

The consensus of opinion among railway men and users of the railroads is that a government railway, being primarily a public service, should be operated, not as a purely profit making concern, but should supply transport facilities to the whole country at as near cost price as practicable. The principle is that of co-operation, in which any profits would accrue directly to the régie and indirectly to the users of the railway. In the last resort, of course, the taxpayers would bear any loss so long as the system remains under government control.

#### Balance Still Bad

That there is need of financial reform is as clear as noonday. On paper and theoretically, the railway administration can show profits of a hundred million or so; but the intricacies of government accountancy in an industrial enterprise like railroads are so subtle that, in many instances, items are entered as assets which are not realizable, while some of the liabilities do not appear in the year to which industrially they properly belong. Therefore, quotations from the balance sheet would only give a false impression. Still, in summarizing the 1924 estimates in the Lower House of Parliament on November 13, Prime Minister Theunis put the facts in their proper light by stating that, chiefly owing to the high cost of fuel and heavy bonuses to employees, the deficit for 1924 will be some thirty million francs (\$1,350,-000 at present exchange rates), although this deficit was several millions higher last year. He added that rates would therefore have to be further increased, but would be lowered later on if the cost of living dropped. The bonuses to employees for high cost of living for the coming year amount to 100 million francs (\$4,500,000). It is interesting to note also that the introduction of the dispatching system has brought about an economy of approximately 25 million francs (\$1,125,000) per annum. This of course, will further reduce the loss as the system is extended.

### Operating Statistics

Leaving out of account all statistics calculated to convey a false impression, the following figures, relating to 1922 (the latest year now available), will give an idea of the post-war position of the Belgian government railroads (excluding company-owned lines):

Length of line in operation 2,996 miles; number of stations 1,376; number of private sidings 1,610; aggregate distance run by passenger and freight trains 38,490,633 miles; revenue per train-mile \$1.32; total receipts 1,125,350,000 francs (\$506,407,500); distance traveled by locomotives (standard gage) 56,136,700 miles; number of passenger coaches 8,995; seating accommodation of passenger coaches 458,452; number of freight cars 123,584; capacity of freight trucks 2,146,647 tons, number of locomotives (standard gage) 5,409; number of passengers carried 224,546,305; freight carried 64,071,576 tons total receipts per kilometer of line in operation 375,655 francs (\$17,000); number of passenger-miles 3,820,634,807; freight-ton-miles, 3,455,674,-278

August is the best month and February the worst in point of gross receipts. The total year's receipts in 1922 were 107 million francs (almost \$5,000,000) more than in 1921 and 245 million francs (\$11,025,000) more than in 1920; but it must be remembered also that rates were also increased in 1922 and that, therefore, a large part of the increased revenue arose from this increase of fares and freight rates. Total receipts for the first nine months of 1923 were 80,-201,000 francs (\$3,610,000) greater than the same period of 1922.

Some of the pre-war years showed loss; others profit; this fact, added to the complexity of government bookkeeping, always made it a moot point whether the nationalized railroad was really a paying proposition.

# Railway Bureaucracy

The chief complaint that users of the Belgian railroads make is that they are bound up with red-tape. Grounds of this very general complaint may be summarized thus:

1. The government discourages any competitive transportation service calculated to interfere with its monopoly.

 Public calls for improvements in train services are unheeded by a central administration which is essentially bureaucratic and which therefore fails to realize local transportation needs.

3. Secure in their positions, and with an equally sure pension when they reach a certain age, the government railway officials have become the masters, instead of the servants,

of the traveling public.

4. The traveling public which pay fares cannot find accommodations in the trains, because the latter are often filled, on the strength of free passes, by government officials, members of Parliament, traveling inspectors from various government departments, and others who, for various reasons, have obtained free travel facilities.

No efforts are made to ensure effective connections at junctions serving important localities.

6. Arrangements for workmen's trains and excursion trains are inadequate.

7. Trains do not run on schedule.

8. Regulations relating to smoking compartments and ladies' compartments are not enforced.

9. Express and freight services are unreasonably slow.

It is a fact that the whole service is hide-bound in regulations.

Human ingenuity seems to have gone its utmost limits in compiling rules and regulations to meet every possible dispute that can arise on the railway, among employees or between employees and the public.

## **Executive Details**

For publicity purposes, the state railway maintains a special office for the issue of press communiqués, illustrated posters and the dispatch of progaganda material abroad. Combined with this office are the publicity services of the post office department, the telegraphs and the telephones, which are all under the direction of the same minister. Special attention is paid here to praising the merits of the service of mailboats plying between Dover and Ostend, which play an important part in passenger transportation between England and most of the countries of Continental Europe.

Summarizing the position at the end of 1923, it would appear that all the railroads have now been reconstructed after war damage; that the tendency is to minimize political control and to replace it by business methods; that, on the whole, the railways are still being operated at a substantial loss; and that traffic, both of passengers and freight, is on

the increase.



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Business Buildings and Apartment Houses Built Over Tracks at Grand Central Terminal, New York

Looking Northeast from Vanderbilt Avenue and Forty-fifth Street



New Wing Being Added to Central Station, Amsterdam

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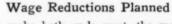
# The Netherlands Railways Are Marking Time

Gross Receipts Decline and Deficits Continue — Wage Reductions and Electrification

By C. Schotel

THE LATEST financial returns do not permit much optimism about the immediate future of the Dutch Railways. According to these returns the receipts for the first nine months of 1923 have been \$49,235,754\* as against \$54,716,220 in the same period of 1922 and \$59,240,730 in 1921. The receipts from the carriage of freight were

\$87.95 for 1922 and \$95.63 for 1921. In considering the figures for the present year it should be noted that on January 1 the rates on l.c.l. freight were lowered. The deficit on the Dutch Railways has to be covered from the public treasury. For the current year this deficit, together with the guaranteed dividend which the state has to provide for as well, is estimated in the state budget for 1924 at \$8,844,000.



In order to make both ends meet, the management proposes to lower all salaries and wages by 10 per cent on January 1, 1924, in accordance with the proposals of the government—which has now resigned on account of the defeat of its naval bill—to lower the salaries and wages of all public servants at the same rate. The management is of opinion that the decrease in the cost of living since the present salaries and wages were fixed in 1920 justifies this decrease. It is to be expected that this decision of the railway management will meet with violent opposition of those concerned. A comparison with the last two years shows that the deficit has gradually been reduced. In 1921 it was nearly \$12,500,000 and last year nearly \$11,500,000.

The gross receipts in 1922 were \$70,494,318 as against \$78,077,646 in 1921, a decrease of 9.71 per cent. The receipts from passenger traffic totaled \$36,301,404 and \$37,833,828 respectively, a decrease of 4.05 per cent, and those for the carriage of freight \$32,733,654 and \$38,547,780, a decrease of 15.08 per cent.

The costs of operation per mile per day were \$83.41 in 1922 as against \$93.98 in 1921, a decrease of 11.25 per cent, which was effected by an extension of the hours of duty of the personnel, by a decrease in the personnel of the central



A Gasoline Motor Car on the Dutch Railways

\$21,660,966 or the first nine months of the present year as against \$25,377,054 in 1922 and \$28,722,096 in 1921.

From January 1, 1923, to the end of September receipts per mile† of line per day have averaged \$79.01 as against

\*Guilders shown in dollars at par of exchange.
†Total for day kilometers given in terms of day miles. Likewise all other metric measures are given in American equivalents.

administration and the more important officers on the lines, by a restriction in the number of passenger trainmen and similar measures. It was moreover possible to lower the consumption of fuel and materials, the prices of which had decreased. Work in course of preparation was postponed and the outstanding 7 per cent loans were converted at lower interest rates. The wage-bill decreased from \$45,450,522 in 1921 to \$44,673,054 in 1922. As to fuel for locomotives, the costs were reduced by 52.09 per cent (\$6,209,694) because the average price per ton of coal was 43.4 per cent lower, the fuel was of better quality and was more economically used. Consumption, therefore, was reduced by 10.1 per cent, although there was a rise of 0.6 per cent in the locomotive-miles. The favorable balance of the operating account was \$1,114,344 in 1922, or \$1,047,-210 higher than in 1921.

The length of lines is as follows (in miles): Main lines. 1,581; local line, 552; tramways, 155, totaling 2,288 miles.



An Unprotected Grade Crossing

On December 31, 1922, the number of persons in the service of the Dutch Railways was 47,567 as against 51,-078 in December, 1921, making a reduction of 3,511 persons. In the annual report which appeared in the course of the present year it was stated that, in view of the then known results of 1923, the future of the company was by no means rosy. It was also stated that thus far the decrease in rates, the establishment, or rather re-establishment, of the so-called "buurtverkeer" (a reduced rate for round-trip-tickets between neighboring stations) had not led to any improvement in net return.

As a means of further economy various new measures have been taken to reduce labor costs. For instance, a number of grade-crossings, formerly tended by watchmen, are not guarded any more. A signboard on both sides of the crossing serves as a warning and as yet this measure has

But the company has other and greater means at its disposal to reduce costs. It is intended to electrify the line which connects the two principal cities of the Netherlands, Amsterdam and Rotterdam. Direct current, 1,500 volts, will be used for this line, because it does not give rise to disturbances on the telegraph and telephone lines as the alternating current does and also because it will be easier to adapt it to the centralization of the generation of electric energy which is to be anticipated in Holland. Overhead contact has been chosen so as to allow a doubling of the voltage later on without changing the structure. By electrification it is hoped to reduce coal consumption from 40 to 50 per cent. The Dutch railways use about 880,000

tons of coal yearly and by a general electrification it will thus be possible to save from 350,000 to 450,000 tons.

A comparison has been made between the fuel expenses per train mile on steam lines and electric lines; they are 28.6 cents for the former and 17.4 for the latter. These figures, however, must be accepted with some reservation, because they are derived as regards the steam lines from all sorts of lines and trains, heavy freight trains included, and as to the electric lines exclusively from the existing Scheveningen-Rotterdam line where only light trains, weighing 165 tons at the most, are used.

Another advantage of electrification pointed out by the chief of electric traction of the Dutch Railways, J. J. W. Van Loenen Martinet, is the reduction of delays in service. In 1922, 85.1 per cent of the electric trains arrived on time, as against 55.7 per cent of the steam trains. As a further advantage the greater cleanliness of electric motive power is cited. Moreover fewer locomotives are required. Acceleration is greater—an important factor, especially as regards local trains.

Formerly the steam express from Amsterdam to Rotterdam covered the distance without stops in 48 minutes. It is intended to make the electric trains cover the distance in the same time, but they will stop at four stations, viz., Haarlem, Leyden, Delft and Schiedam. To do this their speed must be 59 miles per hour. For international traffic the steam line will be maintained as well and besides the electric expresses there will be electric local trains. electric trains will weight about 242 tons and be able to carry 350 persons. The motors are built in such a way that a safe speed of from 78 to 81 miles per hour can be attained. Heating and lighting will be by electricity. The brakes will be of the Westinghouse type, worked by compressed air electrically supplied. The electric locomotives for the new lines will be of modest dimensions, of a type similar to those used by the North Eastern in England. As long as the railway system is not wholly electrified steam will have to be used for heating. For this purpose the electric locomotives will be equipped with steam boilers, which, however, will be heated by electricity.

The third rail as opposed to catenary construction was considered for the Dutch Railways but it was abandoned because of the danger to employees.

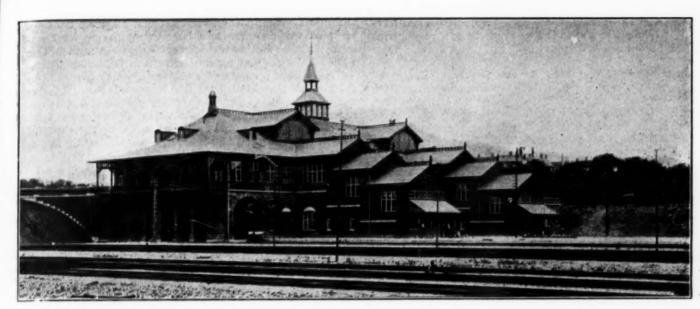
The first electric trains will run between The Hague and Leyden, part of the line between Amsterdam and Rotterdam, at the end of 1923, or at the beginning of 1924.

# Gasoline Motor Cars

As another means of economy trials have been made by the Dutch Railways with gasoline motor cars on the Zwolle-Kampen line. These new motor cars make possible economies in wages, fuel and materials.

A motor car carrying second and third class passengers serves as a substitute for a locomotive, a baggage car, a second class coach and a third class coach, which on less crowded lines are generally only partially occupied. It is not necessary to turn, to take water, to fill the oil lamps and no fireman is needed; one man can operate the motor car and in certain cases, as when the car is destined for one class of passengers only, it can be used as a one-man car.

Both motors of the car can be operated by one man and moreover one man can operate two cars coupled when these are equipped for multiple unit operation. One car has 65 seats and room for 20 standing. The new coaches for Dutch Railways are "made in Germany." Two of the four axles are each driven by a 75 hp. six-cylinder motor, making in this way a capacity of 150 hp. The transmission of the movement from the motors to the axles is similar to that of an ordinary motor car. Lighting is supplied by Bosch dynamo and heating by the cooling-water of the motors. The maximum speed is 46.6 miles per hour,



A Station in Copenhagen, Denmark

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# The Danish Railways Increase Their Earnings

Drop in Price of Fuel Turns Deficit Into Net—Some New Construction Planned

By A. Blichfeldt

W HEN ONE HEARS the Danish railways spoken of, one naturally thinks of the government-owned lines, because all of the main lines connecting the different parts of the country, the islands with each other and with Jutland and either by rail or ferry with neighboring countries, are owned by the state. Private lines, however, have a

A Train Ferry in Denmark

onsiderable mileage, most of which is only of local importance. The state owns and operates about 2,500 miles of rack, about 30 per cent of which represents yard tracks and sidings. There are 68 private operating companies with a mileage not much less than that of the state-owned system. The state also operates ferries in connection with the railways, which ferries operate over routes totaling 105 miles. The State Railways own 27 square miles of real estate. The total capital investment in the State Railways is \$89,000,-

000,\* of which \$16,000,000 represents rolling stock, \$4,500,-000 ferries and \$14,240,000 real estate.

No very recent statistics covering operations are available at the present time, the annual report for the fiscal year ended April 1, 1923, not having been published as yet. The writer has, however, been permitted to see some of the figures which will appear in this report, of which the following are some.

#### Big Decline in Expenses

The State Railways in the year ended April 1, 1923, operated 1,703 miles of line, as compared with 1,692 during the previous fiscal year. There are 444 stations on these lines. The railways owned in 1922-23 a total of 714 locomotives, of which 630 were serviceable and in daily use, as compared with 686 on line and 594 in operation during the previous year. In 1922-23 passenger train-miles totaled 9,516,000 as against 8,820,000 in the previous year. Passengers' journeys totaled 21,461,000, as against 21,825,000 in 1921-22. Gross earnings from operation totaled \$25,910,000, as compared with \$30,394,000 in the previous year while operating expenses declined to \$24,687,000 from \$40,713,000 in the previous year. The great reduction in expenses was accounted for largely by the decrease in the price of fuel. •

## Consumption of Fuel and Lubricants

Thus in 1921-22 the deficit from operations was \$10,319,000, while in 1922-23 there was a net of \$1,223,000. In 1922-23 a total of 306,498 tons of coal were used, as against 300,710 in the previous year—an average of about 25,000 tons a month. The consumption of lubricants in the same year was about 1,210,000 lb. as compared with 1,171,000 lb. in 1921-22. The figures for fuel and lubricants do not include the ferries.

<sup>\*</sup>This figure is changed from kroner at present exchange rates-17.8 cents, compared with a par value of 26.8 cents.

The ferries in 1922-23 made 32,334 round trips and traveled 352,800 miles, as compared with 31,435 round trips and 337,900 miles in the previous year. There are 32 ferry routes.

In the early part of 1923, the new ferryboat "Danmark" was placed in service on the Gedser-Warnemunde line, from the southeastern part of Denmark across the Baltic to Germany. The "Danmark" was built at Elsinore at a cost of more than a million dollars. It is 333 ft. 8 in. long, has a beam of 61 ft. 6 in. and draws 17 ft. 8 in. of water. Its capacity is 716 tons. Experts have declared it one of the largest and best equipped ferryboats in service anywhere in the world. All ferryboats used by the Danish State Railways are built in Denmark, either at Elsinore or by the Burmeister & Wain Company at Copenhagen. All cars are likewise of domestic manufacture, being built for the most part at the Scandia Works in Randers. Until a few years ago all locomotives were imported, but recently Danish industry has entered this field as well and locomotives for the Danish railways are now built by the Frick Works at Aarhus.

## Electrification-Dining Cars-Highway Competition

As elsewhere, in Denmark there has been a lot of talk about electrification but very little has been accomplished. The lines which the advocates of electrification have in mind particularly are, for the most part, suburban lines in and around Copenhagen, including lines serving summer resorts. Thus far, however, the only step that has been taken toward the use of any motive power other than steam is the placing in service of an experimental motor car between Aarhus in Jutland and the little town of Braband.

Dining cars are not used to any great extent in Denmark, because of the comparatively short journeys which are possible on land, due to the many islands. The ferryboats, however, are provided with excellent restaurants, as are all the principal stations. Recently, however, on one of the longest railway runs in the country (that from Aalborg in the northern part of Jutland down to Paddeborg on the Schleswig frontier) dining car service has been installed. Sleeping car accommodations have been extended to include third-class



Approach to Station, Copenhagen

passengers on the railway and car-ferry route from Copenhagen to Jutland.

Motorbuses are being operated on a number of routes, especially in Jutland, and these, which run at hours when there are no trains, are increasing the service to the traveling public, but at some loss of revenue to the railways. Their fares also are as a rule lower than the railway fares.

## Grade-Crossing Elimination and New Construction

The Danish railways have spent large sums of money on the elimination of grade crossings and the work is being continued. Elimination is carried out by building viaducts and subways and, owing to the fact that all grade crossings are protected, these are to a large extent paying for themselves in the watchmen's wages which they save. Some \$2,850,000 was spent for this purpose in 1923.

The railroad committee for Schleswig, which province was reunited to Denmark under the Treaty of Versailles, has recommended the construction of five new lines in this territory and the building of a new station at the frontier town of Paddeborg, which work will cost in the neighborhood of \$2,500,000. In addition, a new north and south line is under construction in the island of Zealand.

## Traffic Light on Private Lines

The privately operated lines of Denmark have a mileage nearly as great as that of the Danish State Railways. Dur-



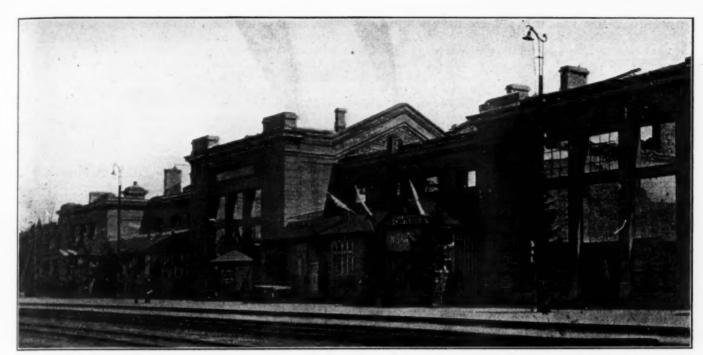
Station at Elsinore

ing 1923 there were no developments of any great importance in connection with these lines. The last available report of their operations, that for the fiscal year 1921-22, shows the total number of their employees at only 3,652. The number of locomotives owned by these lines in the same year was 329 and passengers handled 4,015,841. Earnings from passenger traffic totaled \$2,407,283 and freight traffic \$3,863,287. Total operating income was \$6,829,506 and operating expenses \$6,437,138.

The State Railways give employment to five times as many persons as the privately owned lines in spite of the fact that the mileage of the government and private lines is approximately equal. The work, however, done by the government lines, as measured in passenger-miles and ton-miles, is about five times that done by the private lines.

## New Station at Copenhagen Proves Its Worth

When the first railway in Denmark, running from Copenhagen to the old residence of the Danish kings, Roskilde, 19 miles from the capital, was opened about 75 years ago, the Copenhagen terminus was located on land which since that time has come to be worth an immense sum of money. Consequently, several years ago a new station was built to accommodate much heavier traffic and the tracks were covered, thereby releasing a considerable area of valuable surface rights for other purposes. Thoroughfares were laid out on some of the areas thus abandoned. The new station is reached by a tunnel, which is not long and is sufficiently large and airy not to be a nuisance to passengers. This new arrangement has been working satisfactorily for several years and, as a result of the improvement, the neighborhood around the station has been greatly improved. When the whole matter has been adjusted, the state will probably realize enough from the sale of valuable lots to reimburse itself in large part for its outlay.



Station at Zamierce, Poland

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# Polish Railways Still Badly Handicapped

Rehabilitation Not Completed and Finances in Bad Shape
—Trouble at Danzig Corridor

By G. M. Oehm

POLAND, tucked away in a niche, surrounded by former part owners, is today in the midst of a construction and reconstruction program for her railway systems which when completed, will enable her to care for the transportation demands and take her place, in her own small way, in the great network of international railways which goes to make up Europe's transportation system. Poland, the land which nations have fought over, won and lost, for centuries, has put her shoulder to the wheel of progress and is slowly but surely turning it toward success.

Polish leaders, finally given an opportunity through the Treaty of Versailles of attempting to secure for Poland her proper place in international affairs, quickly realized that her transportation system—never anything much to cheer about and largely made impotent during the war—must be rebuilt. Not only must it be rebuilt but it must be enlarged, modernized and made uniform throughout.

The chief problem, aside from technicalities, was the problem of financing this great task. The revenues from income were insufficient even to meet current expenses. Much reconstruction was urgently needed even before normal service could be re-established.

## Reconstruction of Bridges

War had left its mark on Polish railroads, especially the vital bridges which were ruthlessly destroyed as armies advanced and retreated. Internal loans were floated and money obtained to begin the preliminary activities of carrying out the detailed program. During the war 249 large bridges, representing a total distance, if placed end to end, of 15 miles, were destroyed. These had to be replaced with bridges which would be stronger and more durable than anything hitherto

constructed in Poland. Not only were 249 large bridges destroyed, but a careful check showed that 7,500 smaller ones, with a total length of 4.3 miles, had to be replaced just to attain pre-war status—a total of 7,749 bridges totaling 20 miles. Railroad men can vizualize what this one task alone meant to Polish engineers who had little or nothing with which to begin—little or nothing but determination. At the present time more than 50 per cent of this task has been completed. During 1922 and in the years previous thereto, 31 per cent of these bridges were rebuilt. Work was speeded in 1923 and early in the year more than 20 per cent more had been added to what already was restored.

## Other Necessary Reconstruction

The destruction of war was naturally not confined to bridges and trackage. Picture Poland's reconstruction problem in all its ramifications—in destroyed buildings, stations, water tanks, ordinary buildings, sheds—in fact every sort of property owned and operated by a railroad system. A total of 93 railroad stations were laid waste, 491 train sheds, 354 water tanks, 1,358 buildings of various description, 250 administrative buildings and 304 other important edifices variously cataloged.

Up to 1921 half of this destroyed property had been restored. Much of it was temporarily replaced and eventually will be torn down and permanent buildings erected. But speed was necessary and makeshift buildings were thrown up at the most important points. Poland wanted to get moving rapidly and speed took the place of permanence in the thoughts of those at the head of affairs. At the end of 1922, however, more permanent reconstruction had been undertaken so that at the beginning of 1923 at least 50 per

cent of the destroyed buildings had actually been replaced by permanent structures which were much better and more modern than the pre-war buildings. During 1923 the program was continued and it is hoped within a very short time to have erased all traces of war destruction—at least as far as buildings are concerned. The finest part of the whole great undertaking will be that, when completed, almost everything about the Polish railway system will be thoroughly modern.

This program, as already said, cannot be carried out without money. So far the Polish people have answered heartily to all calls and now face the task of furnishing, through an internal loan, \$238,000,000 with which to carry on the work.

The whole program, according to present plans, will be completed entirely in 10 years. The chief construction work now being rushed consists of lines to the coal fields and it is hoped to have the two main lines entering this area completed entirely in 1925. A third line, centering in Warsaw, will be ready for final touches in 1927.

# Rolling Stock

The war destroyed rolling stock as well as structures. The total number of passenger cars remaining after the armistice was 8,226, of which 6,351 are now in serviceable condition and 1,875 awaiting repairs. The freight car supply was also greatly reduced, only 2,700 cars being left to Poland when the reconstruction was undertaken. There were but 2,627 serviceable locomotives. The total number of freight cars now on line is 95,920 of which 77,820 are in working order.

# Promoting International Traffic

But Poland faced and faces not only the problem of replacing what actually was destroyed by men and munitions, but of unifying and organizing and relating to international railway communication a railway system which in and of itself would be of little importance.

Poland is formed of parts of other nations, viz., Germany, Russia and Austria. For many years it had been dominated by foreign nations. Its own language had been largely supplanted. In one section Russian was spoken; in another German; but all over the land an effort was made to retain Polish as a fundamental tongue. Poland realizes that her size and her inability to maintain herself by her own production make necessary the facilitating of communication with other countries. Much has been done to this end but the greater part of the task still lies ahead.

At the end of her building program she will be in a position to say to the nations adjoining her that she is ready to co-operate in connection with long distance connections. Already a plan is under way to institute through train service through Berlin, the Hook of Holland and on to London. But, as said, the idea of developing international communication is one of the future rather than the present.

The problem of providing through service and rates is made especially difficult because of the jealousies and hatreds existing between the little nations in this section of the Continent.

Poland has also a gage problem to contend with. In the section of Poland that once was Germany and Austria the standard gage prevails; the section that was once owned and operated by Russia has the 5 ft. gage. This means that trains starting in the German section and running into the Russian section must be unloaded and reloaded into cars operating on a different gage. The Polish government is, however, changing its entire system to standard gage.

#### Personnel

The Polish railroads today employ about 16.4 persons to the mile. The government's budget called for only 70,320 persons in 1922 but actually 167,410 persons were employed, 97,090 being taken on over and above original plans. However, reductions in force have been made this year so that today 163,904 persons are listed on the payrolls of the rail-road administration.

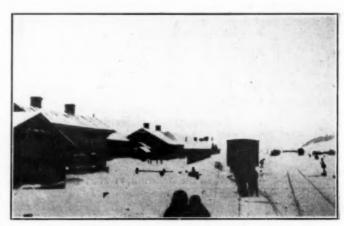
After the war Polish railway employees were granted the eight-hour day which they still retain. Naturally, with the railways practically destroyed and with the realization that they must be rebuilt as quickly and as thoroughly as possible, the Polish government saw the need of thorough discipline among its railway employees. Labor troubles were frequent and often violent. The government not long ago attempted to gain this discipline through militarizing the railroadsputting the whole program and its accomplishment in the hands of the army. It was virtually a declaration of the state of siege over the railroads and the placing of the civil personnel under military control. Naturally, free labor became indignant and a general strike resulted, with the chief center in Krakow. The struggle lasted several days, ending with the death of 80 workmen and 20 others and the withdrawal of the attempt on the part of the government to militarize the railways.

## The Danzig Corridor

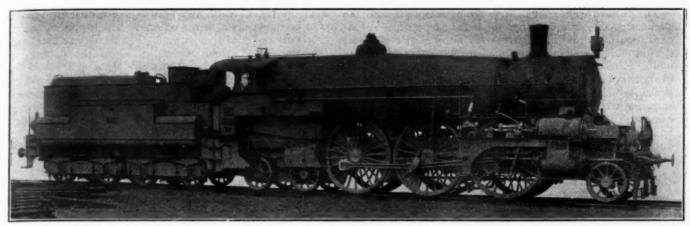
The Danzig corridor (i.e., the strip of land assigned to Poland which separates East Prussia from the rest of Germany) furnishes today and promises to continue in the future one of the biggest problems which Polish railway officers have to solve. Germany resents the splitting of her northern and eastern lands by this strip of Polish territory and makes every difficulty possible in order to create a demand for the return of this strip of territory to German control.

Poland, however, will continue her fight to retain the strip which connects her inland territory with the free city of Danzig and gives her a sea-port. Moreover, to impress on everyone the fact that the territory is Polish and must be so recognized, the Polish government requires a Polish visa from every traveler, be he German going from one section of Germany to another or transient traveler of any nation who crosses this strip. Polish travelers coming from the main section of the country may travel through to Danzig without a visa—they are still on Polish soil. Germany, on the other hand, requires a German visa of corridor dwellers who wish to cross East Prussia into Poland.

Naturally, this jealousy boils over into railroad circles. A train starting at Berlin and running to Koenigsberg in East Prussia must cross the Polish corridor. The Polish railway officers do not like this, as it is a losing proposition to exchange any kind of money for German currency—which the traveler pays for his trip. After the war passengers were made to go around the strip, but on June 1, 1922, an arrangement was reached so that travel was resumed across the corridor.



Snow Brings Increasing Difficulties in Russia



Czechoslovak Express Passenger Locomotive

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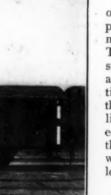
# Czechoslovak Railways Bring Down the Deficit

Plan to Reorganize Government Lines to Imitate Organization of Private Company

By Dr. Vaclav Partl

THE REPUBLIC of Czechoslovakia is situated in the center of Europe, between Germany, Poland, Roumania, Hungary and Austria. The surface of the country is moderately hilly, with chains of small mountains on the frontiers—especially in the north along the German and Polish borders—and with stretches of fertile plains along the most important rivers, viz., the Elbe, the Morava and the

Czechoslovakia an outlet to the sea; consequently the Czechoslovak railways are not so exclusively dependent on foreign railways for connections with the sea as they otherwise would be. The position of the country gives the Czechoslovak railways another important mission in internal and international trade, making them the connecting link between the west of Europe and southern Russia.



A Czechoslovak Box Car, 19.8 Tons' Capacity

Danube. The proximity of Germany, with its highly developed industry and its direct contact with the sea, makes the economic task of the Czechoslovak railway system a difficult and complicated one, since Germany is the most serious competitor of Czechoslovakia not only in transportation but generally with regard to the whole economic activity of the country.

The independence of the transportation policy of Czechoslovakia had been increased by the internationalization of the three important rivers, Elbe, Oder and Danube, giving

## Railways Government Operated

Czechoslovakia has a comparatively well developed system of railways, being in fifth place in Europe from the standpoint of the ratio of mileage to area. There are in all 8,298 miles of line, of which about 930 miles are double track. Three-quarters of this mileage is owned and operated by the state. The only lines in private ownership are of secondary significance. They belong especially to cities and counties and were originally built for local purposes, but all of them are operated by the state, along with the state-owned lines. The density of the system being adequate to the economic needs of the country (151 miles per 1,000 sq. mi.), the Czechoslovak Railway Administration at the end of the war met with a comparatively simple reorganization problem, at least as far as the mileage was concerned.

## Reconditioning of Lines First Task

The administration's first task was the reconditioning of the existing lines, the maintenance of which had been severely curtailed during the war. The fact that the country has a strong iron and steel industry for producing rails and is at the same time an important exporter of lumber and ties is responsible for the normal maintenance which the railways have received during the past two years. Some important, but short, new lines were needed to connect lines centering on points beyond the international boundaries set up by the Peace Treaty and to effect an orientation of the system on the new economic and administrative centers of the country. Since 1920 about 30 miles of these connecting links have been built and other projects for construction of similar character are ei her under consideration or are being carried out step by stop. Some more important stretches of track have at the same time been doubled and unnecessary curves eliminated.

The roadway reconstruction program comprises also the elimination of grade crossings in so far as possible. Modernization of yards, which were very much neglected under the old political regime, constitutes another object of activity of the Czechoslovak Railway Administration. The process of railway nationalization, which is a generally accepted principle in Europe, had been continued in Czechoslovakia since the war, and the three most important private railway concerns still in existence, the Bushtehrad, the Usti-Teplice and the Kosice-Bohumin lines were purchased by the state during the fiscal year 1922-23.

# A Satisfactory Rolling-Stock Situation

The rolling-stock situation is comparatively satisfactory. Thanks to a car and locomotive industry in the country, as



A Freight Locomotive in Czechoslovakia

well as to the modern repair facilities of the railways themselves, the effects of the war on rolling stock were speedily removed and a considerable quantity of new equipment has been placed in service, so that, except perhaps for passenger cars, the rolling stock may be considered as in a good working condition and up-to-date. In 1921 the State Railways had 7,352 passenger cars with 9,666 first, 37,896 second and 302,915 third-class seats; there were in the same year 420 mail, 2,509 baggage and service and 93,213 freight cars, among the latter being 36,972 box and 57,141 open-top cars. The total carrying capacity of these cars was 1,540,097 tons,\* the average capacity per car thus being 16.5 tons.

Special attention has been paid since 1921 to the development of freight service; the stock of passenger cars has been more or less purposely only slightly increased (8,156 at present) and in 1923 there was still a slight shortage of passenger accommodation. About 200 new passenger cars ordered at the beginning of 1923 are in process of delivery now, so that toward the end of this year the passenger stock will attain the figure of 8,356 cars. The number of freight cars has been increased since 1921 by about 20 per cent, reaching a total of 117,885 toward the end of September, 1923, including the 8,183 cars acquired by the nationalization of the Bushtehrad Railway.

The supply of available cars in 1921 was not adequate to the demand and against available loads for 3,521,862 cars required, only 2,878,734 were actually loaded, this being about 81 per cent. The best conditions in this regard obtained in the mining districts of the country where 99 per cent of the cars required were supplied, and in the same way other essential commodities enjoyed preference in car supply (grain, potatoes, fertilizers, etc.). In consequence of the new acquisitions and the falling off in business, the rolling

\*Tons and other weights and measures as they stand here are in American units, having been changed from the metric units given by the author—Editor.

stock of the Czechoslovak Railways exceeded in 1923 the transportation needs of the country. The supply of box cars especially exceeded the demand. The number of cars loaded between April 1 and September 30 of the present year (1923) was 1,862,512 for intrastate trade and 316,042 for export, which is an improvement of 147,035 and 58,446 cars respectively, as compared with the same period of the preceding year. Train miles have shown a steady increase since 1919. In that year they totaled only 30,579,280; in 1920, 41,224,464; in 1921, 48,611,702; in 1922, 52,908,264; the estimate for 1923 is 65,701,427.

#### Locomotives and Fuel

The number of locomotives on line in 1919 was 3,424; in September, 1923, this total had reached 4,457; now the pre-war average of number of locomotives per mile of line has been restored. About 32 per cent of the locomotives are held for repairs as against 25 per cent before the war. Since 1919 a total of 447 locomotives of the most modern types have been built for the State Railways by factories in the country. Performance totaled 76,258,800 locomotive miles in 1921, or an increase of 14.3 per cent over 1920, although locomotives on line increased only by 4.8 per cent in the same time. For the year 1924 orders will be placed for 85 new locomotives and 35 new tenders. The application of



Wilson Station, Prague

superheaters to all power has been started and is actively continued.

Coal consumption in 1921 was 3,151,959 tons of lignite and 1,470,049 tons of pit coal, which, expressed in the so-called "normal coal," is 4,902,535 tons. This was an increase of 0.7 per cent as compared with the preceding year, but, considering the greater performance in 1921, the average consumption per locomotive mile fell from 145.7 lb. to 128.3 lb., thus showing a saving in coal consumption of 12 per cent in 1921. There is no record of a reduction in the consumption of other supplies, such as lubricants, most of which are imported and are of rather poor quality. The oil fields owned by the Czechoslovak Railways at Gbely can supply only a comparatively small portion of the consumption, these wells not having shown the production originally

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expected of them. Gas from this region is utilized for lighting purposes on the railways.

## Standardization of Shop Practice

Great savings are expected from the introduction of the principle of "normalization," i. e., standardization, which is going on in the shops, putting all of them on the same basis with the same working standards. With the "normalization," more efficient and more economical operating methods were promised by the Minister of Railways in his recent report to Parliament.

At present there are only 292 miles of electric lines in the country, but active preparations are being made for rapid progress in electrifying the whole system in the next few years.

# Organization of the Railways

Operation of the railways is carried on by the Ministry of Railways, a government department. Much criticism had been expressed with regard to this form of organization and a great deal of it is admitted to be true, especially the objection that this form of administration is connecting the railroads too much with the political life of the country, this having a detrimental effect on their operation and their financial results. The Ministry is acting on one side as the highest executive and legislative railroad authority, representing it before Parliament; at the same time it is in active control of railroad operation. The first of the two sections of the Ministry is charged with preparing railroad legislation, the regulation of rates and conditions of carriage, the regulation of railroad finance and interchange with foreign railways.

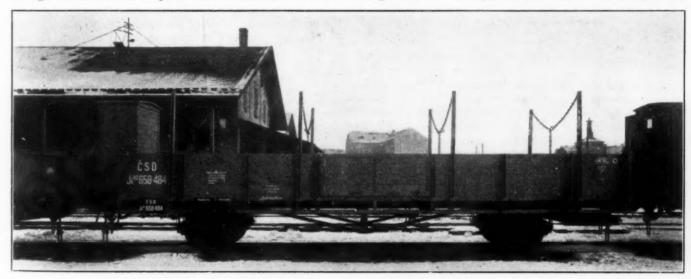
In its rate policy the Railway Ministry is supposed to be autonomous, but it is practically bound to consider the wishes and demands of industry, commerce and agriculture, which are communicated to it in two ways, viz., by the Ministry of Commerce, which usually considers proposed rate change measures with the chambers of commerce of the country, and through the medium of a special rate committee of the rail-

The operating section of the Railway Ministry is, properly speaking, a kind of a general management of the Czechoslovak railroads; it is organized departmentally with eight regional divisions called "directions" (managements) located at the most important railroad points. These managements also are organized departmentally, their local executives being the station masters. The most important objection raised against this organization is that it is over-staffed and, without any doubt, in this regard a great deal remains



A Railway Viaduct in Czechoslovakia

to be done—as in most European countries—to bring about a reduction in personnel, the present excess laying considerable financial burden on the railroads and often even excluding the possibility of developing modern efficient methods. The official report for 1921 gives the number of employees in the administrative section of the Ministry at 239 men; in the operating section at 176,691 officers and employees, both temporary and permanent. This number, being about 21.3 men per mile of line, has been repeatedly



An Open Top Car on the Czechoslovak Railways

ways themselves in which men prominent in industrial life take part, being appointed for a limited period of time by the Minister of Railways in understanding with the Ministers of Commerce and Agriculture. To deal with general question of railroad policy and practice another advisory body, the Czechoslovak Railway Council, was created in 1921. Its members are appointed by the Railway Minister on the basis of proposals made to him by the other three "economic ministries."

pointed to as excessive and the Ministry adopted in 1922 a policy of reduction which has reduced this number by about 10 per cent.

### Traffic Gross and Deficits

In 1921 a total of 186.4 million passengers were handled, an increase of 12 million over 1920. Of these passengers 0.04 per cent traveled first, 2.93 per cent second and 96.17 per cent third-class; soldiers carried made up 0.86 per cent

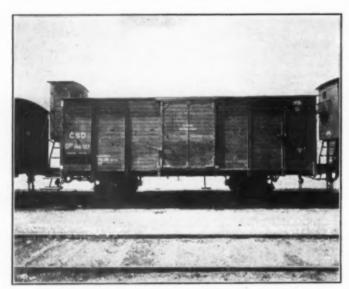
of the total. On workmen's tickets 39 million (21 per cent of the total passengers) were carried. Of the total, four million passengers traveled by express trains, in which the average journey per person was 87 miles, whereas in the accommodation trains the average journey amounted to 27 miles. A total of 50.4 million tons of freight were transported in 1921, 1.9 per cent more than in 1920, and 3,557 million ton-miles were handled, 6.77 per cent more than in 1920.

Total operating revenues were as follows:

Year														*Amount in Czechoslovak crowns	In dollars
1919.		 			 			0	0	0	0		0	1,128,171,660	33,845,150
1920.		 			0		 	 	0					3,032,474,090	90,974,223
1921.		 	0	0					0	0			0	3,785,561,900	113,566,857
1922.							 							3,434,980,900	103,049,427

\*For convenience figures in Czechoslovak crowns have been changed to dollars at 3 cents each (approximately the present exchange value), whereas at par they are worth 20.3 cents. It is not strictly accurate to change these figures to dollars at current rates, because the crown has fluctuated in value considerably, being worth considerably less, in dollars, a year or so ago than at the present time.

The slight decrease in 1922 was due mainly to rate cuts due to the rise in value of the Czechoslovak crown. Of the total for 1921, 736,000,000 crowns (approximately \$22,-



A 16.5-Ton Box Car with Brakeman's Cab

000,000 at present exchange rates) was derived from passenger service and 2,921 million (about \$87,500,000) from freight service. According to the budget for 1923 the total revenue from transportation service is expected to be 4,950 million crowns (about \$138,000,000) which is considerably more than in 1922. In consequence of the rise in value of the Czechoslovak crown toward the end of 1922 many rate reductions were necessary, and so it is not unlikely that the actual earnings may fall below the estimate.

## Financial Results

The financial results of the operating of the Czechoslovak Railways for the past few years are given in the following table in Czechoslovak crowns:

	1919	1920	1921	1922
Expenses	1,630,401,730	4,531,999,630	5,634,361,800	4,984,916,030
Revenues				
Deficit	419,101,980	1,258,613,030	570,053,150	490,989,470

In 1923 the operating deficit up to September 30 totaled 197,840,000 crowns (about \$5,900,000), which is more favorable than in the previous years; it can be expected, moreover, that this will continue to decrease in the remaining months of the year in consequence of the revival of trade

in the country and the disappearing German railway competition, which was particularly severe in the first half of this year due to the steady depreciation of German currency and the cheap rates resulting from it. Since 1921 maintenance and investment expenses have been included in operating expenses—capital investment appearing in the account not as principal but as interest plus a certain yearly amortization charge.

# An Effort to Imitate Organization of Private Company

Although the unsatisfactory results obtained by the Czechoslovak Railways are fully explicable by the difficult conditions met with since the war, the fact remains that the railways continuously are making heavy drafts on the state budget, thus endangering its stability, and are contributing to the difficulty of the final solution of the country's currency problem. This fact has given rise to endeavors on the part of the state financial administration to bring the state railways to a self-supporting basis. The result of these endeavors was a law passed on December 18, 1922, empowering the government to organize the operation of the railways as if they were under private ownership. Under this law the government would introduce into the management of the railways the principles of private business, would grant them the necessary freedom of action for their business purposes and would detach their officers and employees and their accounting entirely from the other government departments with which they are today closely associated. naturally not to the advantage of the state finances. It is not an easy matter, however, to put this law into effect and the preparations for this purpose have not proceeded very

However, the Minister of Railways has promised tentatively that the new system of operation will be put into effect on one of the "directions" on January 1, 1924. This may be delayed, however, which is regrettable since in Austria a similar system of railway control has been in operation since October 1, 1923.

# Rates

The rate policy of the Czechoslovak Railways is based on the pre-war tariff system of the old Austrian railways. The building up of its own independent rate structure in keeping with the new economic and political situation is proceeding gradually in collaboration with many advisory bodies representing all branches of economic activity in the country. The present tariff is based on the mileage basis with decreasing rates for more distant points. At the present time railway rates are from 5 to 7 times the pre-war level, whereasthe cost of living is about 9.7 times the pre-war.

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The railways have been actively trying to overcome the difficulties which stand in the way of through rates. This is natural considering the interest of the country in the development of its exports. The difficulties, however, are many, one of the most serious being the political prejudices of the Central European nations. In 1921 the Czechoslovak railways set up through rates to the port of Trieste in Italy: in 1923 they were able to secure arrangements for through rates with Roumania and Hungary; negotiations to the same end now are pending with Germany; and preparatory work in this direction has been done with regard to Switzerland. France, Belgium and Holland. International through passenger trains have been running comparatively satisfactorily since 1920 and only the recent disorganized condition of Germany has interfered with this through service.

The railways have taken an active part in working to secure international collaboration among the railways of European countries. With regard to the standardization of European railway practice and the establishment of legal security for international railway interchange they have participated in all progressive steps thus far taken.



Winter in Jugoslavia

# Balkan Railway Problem Far from Solution

Jugoslavia Faces Task of Welding Many Lines Into One System and Developing Ports

By Prince Lazarovich-Hrebelianovich

THE BALKAN WARS and the world war changed entirely the map of the Balkans and of Central Europe and left a deep imprint on the economic life of those regions by shifting the centers of finance and commerce and changing the relative value and importance of the existing railways, necessitating the building of new railways and of new tide-water outlets for overseas trade.

Up to the break-up of the Austro-Hungarian monarchy, whose territorial expanse covered nearly all of the southern and eastern part of what is termed Central Europe, the centers of finance and commerce serving that territorial expanse were Vienna and Budapest. The great producing districts were the northern half of the Austrian part of the monarchy and the great and agriculturally rich Danubian plains in the Hungarian part. The Balkan provinces of the empire and the independent Balkan states were up to the world war economically neither important nor independent and their railways were of little more than local character, with the exception of the line from Belgrade to Nish in Serbia, thence through Sofia in Bulgaria to Constantinople in Turkey, used by the so-called "Orient Express" running from Paris through Vienna and Budapest, Belgrade and Sofia to Constantinople.

Of tide-water harbors that served Austria-Hungary and Central Europe only Trieste and Fiume were of much importance. Trieste was the harbor of the Austrian part and Fiume the harbor of the Hungarian part of the defunct monarchy. As the only ports of the monarchy's coast line that were in a relatively favorable position in regard to the economic centers of the empire, the position of those two ports in world trade became a question of utmost political im-

portance and thus the Austrian as well as the Hungarian governments developed those ports, supported their rail traffic and provided them with an adequate merchant marine by means of general taxes levied throughout the empire. Thus the railroad policy of the government was to aid Trieste and Fiume to enter into competition with the German harbors of Hamburg and Bremen, the Danube-Black sea harbors of Galatz and Braila and the Ægean sea harbor of Salonika for the export and import trade of the great productive centers of Austria-Hungary. The aid so extended was also aimed at diverting South German trade to these Adriatic ports.

#### Geographical Characteristics

That part of the shores of the Adriatic sea belonging to the dual monarchy's sea coast is separated from the distant, rich and productive hinterland by ranges upon ranges of high mountains, whose seaward slopes rise abruptly from the waters of the Adriatic to heights of some 3,000 feet. A scant 12 miles north and east of the harbor of Fiume and a scant 30 miles north of Trieste lies the watershed between the Black sea and Adriatic drainage basins. There rise springs whose waters flow 750 miles eastward across the rich plains of Central Europe and the Balkans to empty into the Black sea. Ninety-five miles east of Fiume at Sissak as the crow flies is the head of navigation of the Sava river, a Danube tributary, and from there river steamers carry goods to Budapest, Vienna, Germany and also down the Danube to the harbors of Galatz, Braila and Sulina on the Black sea.

In the interest of those two Adriatic ports, a freight and passenger tariff policy was inaugurated in the early 80's creating preferential rates for them. In addition, a system

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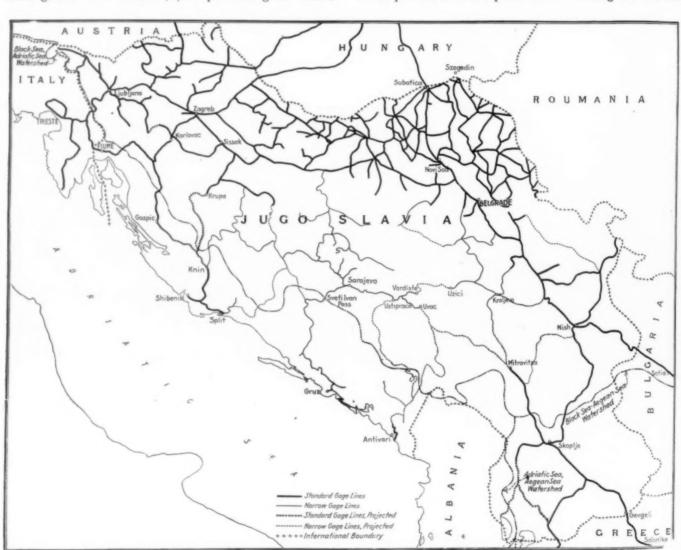
of rebates was introduced amounting to as much as 10 per cent on the special commodity tariff for goods destined for export. This policy succeeded in bringing a considerable traffic to these two ports, in spite of their natural disadvan-

This and other political considerations involved in managing the Austrian State Railways brought about deficits to be made up by taxation averaging \$138,000,000 a year (the figures in Austrian gold kronen are expressed for convenience in U. S. currency). Besides that the Southern Railway (Südbahn) a private company, owned by French capital, which operated a double-track line from Vienna to Trieste with a branch to Fiume, operated its system under a government guarantee of around \$8,500 per mile gross income.

4. The territories of Trieste and Fiume, which became part of the Italian kingdom, thereby becoming politically, and consequently economically, detached from the hinterland that formerly fed their trade by means of taxation. Being deprived of this trade, these cities face natural death as ports.

5. Jugoslav countries, viz., the Slovene lands, Croatia, Dalmatia, Bosnia and Hercegovina, which have joined Serbia and Montenegro in the newly formed State of the Serbs, Croats and Slovenes, which state holds the Adriatic shore line which formerly was the coast line of the Austro-Hungarian monarchy, with the exception of course of Trieste and Fiume, which went to Italy.

The provisions of the peace treaties making the Danube



The Railways of Jugoslavia

Fiume was served by the Hungarian State Railways, which also had to be supported in part from the public treasury.

### What Became of Austria-Hungary?

As a result of the war, Austria-Hungary was broken up to form:

1. The independent states of German Austria, Czecho-Slovakia and Hungary, land-locked nations without sea coast.

2. The Polish provinces of Galicia, which joined the newly erected Polish state, having a tide-water trade outlet at

3. Transylvania and the parts of Hungary which joined Rumania, with tide-water outlets on the Black sea.

river a neutral international water highway indirectly gives tide-water facilities at river-home-ports to the land-locked states of German Austria, Czecho-Slovakia and Hungary, and waterway facilities between those states and Jugoslavia, which is also a participant in the navigable Danube river system.

# Descent to Adriatic Is Sharp, Steep and Costly

By reason of its very mountainous character the western part of the Balkan peninsula is most unfavorable to efficient railroad construction and operation. Construction is extremely costly, because of the great depth of the narrow valleys, necessitating extremely difficult engineering work, heavy ecame

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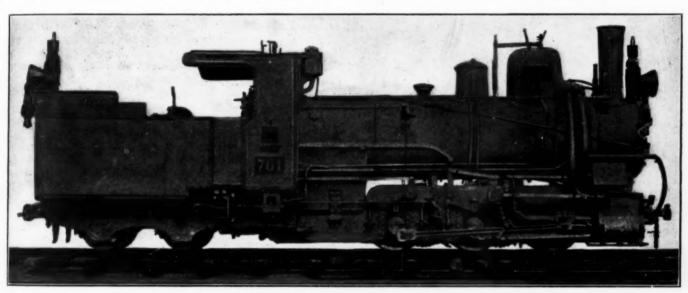
gradients and sharp and frequent curves. The existing railways in negotiating the watersheds near the Adriatic have grades of over 2.5 per cent, and curves of 35 deg. are quite common. The line across the Sveti Ivan pass and across the Komar pass (the elevation at the Sveti Ivan pass is 3,686 ft.) had to be of the rack type with grades of 3.5 per cent, 4.5 per cent and 6 per cent for stretches totaling 18 miles. To reach tide-water, the roads have to overcome elevation of over 1,000 ft. on the seaward slopes of the mountain ranges, within a distance of a couple of miles or so, exposed to the periodic gales of hurricane velocity known as the Borrea and Sirocco.

The seaward ranges from the Adriatic-Black sea watershed on are of limestone structure denuded for the most part of forest growth and very poor in water. This causes great difficulties in meeting the water requirements of the roads and necessitated the construction of large impounding reser-The reservoir at Perkovic, on the line leading from the harbors of Shibenik and Split on the Adriatic to Knin, has an impounding area of 247,580 sq. ft. and has two storage basins of 792,500 gal. capacity each. For approximately every eight line miles in operation there is one large storage tank, and the roads have also tank cars of 2,600 gal., 3,900

Vardar river systems, pouring their waters into the Black sea and Ægean sea respectively; only one-quarter of that territory is drained into the Adriatic sea. The western parts of Jugoslavia nearest to the Adriatic are exceedingly mountainous and rocky, and the nearer they are to the Adriatic the less productive they are, while the further away they are from the Adriatic shores the richer and more productive is the country, which gradually changes into rich alluvial plain lands.

The new state of the Serbs, Croats and Slovenes-the unification of three branches of the same nation into one statefound itself upon its creation possessed of a system of railways composed of five parts, each of which before the war had existed as a system for a state now no longer in existence.

The state of the Serbs, Croats and Slovenes has 3,538 route-miles of standard gage railways and 1,020 route-miles of 30-in. gage. Roughly, 57 per cent of the total route mileage of the standard gage lines and 77 per cent of the narrow gage is owned by the state and operated by it. The remainder is owned by private corporations. Most of these privately owned lines were built under charters giving them a state guarantee of a specific gross income per mile of line.



A Narrow Gage, Rack Rail Locomotive

gal. and 5,300 gal. capacity for the supplying of water to any

station that may be in need of it.

The eastern part of the Balkan peninsula with its great valleys is more favorable to railroad construction, but even there the prevailing grades are heavy. Thus the line from Nish to Sofia, used by the through train from Paris to Constantinople, has prevailing grades of 1 per cent and 1.25 per cent, with 2 per cent and 2.5 per cent maximums grade in one sector and curves as sharp as 6 deg. 20 min.

The northern part of the Peninsula, through which run the Danube and its tributaries, is an excellent place for railway construction and development. To this can also be added the valley of the Vardar toward the south, which, together with the Morava valley, is a region of such gentle contour that the watershed between the two rivers is negotiated by the railway without resort to loops or other heavy work and the prevailing grade of the line from Belgrade to Salonika passing through this country has a ruling grade of only 0.6 per cent with a maximum of 1 per cent in four places and of 1.5 per cent at the watershed.

The territory of the Serb, Croat and Slovene state covers an area of 106,000 square miles (a little larger than New York, New Jersey and Pennsylvania combined), threequarters of which belong hydrographically to the Danube and With some few exceptions all those privately owned roads are today operated by the Jugoslav State Railroad Administration, which either pays the owners a yearly rental or operates the roads at net cost, participating in the net earnings. The Southern Railway (Südbahn)—a private corporation, the stock of which is mostly owned in France-operates 464 line-miles of line, of which 331 miles are owned by that corporation and 133 miles are operated by it for the account of the owners. The Southern operates at present under a provisional arrangement with the Jugoslav government pending a final settlement.

# Rolling Stock

LOCOMOTIVES ON LINE IN JUGOSLAVIA\*

- 1,388 standard gage of various types, of which:
  701 are in service condition.
  431 narrow gage, of which:
  253 are in service condition.
  340 locomotives of all types are abroad for repair.
  On account of reparations Germany has still to deliver:
  400 standard gage locomotives and
  50 narrow gage locomotives,
  which will bring the total of standard gage locomotives to....
  and the total of narrow gage locomotives to....
- \*From a statement made by the Minister for Communications in June, 1923.
- At present the Jugoslav railways have 38,065 carsstandard and narrow gage-of all classes and types, of which

14,000 are in great need of repair. Five thousand cars of the latest types are still to be delivered by Germany on account of reparations.

The older of the standard and narrow gage cars-passenger as well as freight, of which quite a large number is still in use-are of the two-axle, four-wheel type. The older standard gage freight cars have a capacity of 11 tons. The newer types of standard gage freight cars have three or four axles and capacities of 13, 16.5 and 22 tons. The tareweight of standard gage freight cars is approximately from 53 per cent to 60 per cent of the paying load with cars of the older types, and 48 per cent to 55 per cent with cars of the new types. The narrow gage freight cars of the older type had a capacity of only 6.5 tons. The newer types of freight cars, at present roughly 70 per cent of the total narrow gage freight rolling stock, have more than two axles and capacities of 11, 13.4 and 16.5 tons and a limited number of these cars have 22 tons' capacity.

All the newer types of passenger cars have passages or



Along the Orient Railway in the Balkans

corridors either along one side or through the middle of the car and are provided with vestibules. They all are steamheated, lighted with oil or electricity and provided with automatic vacuum brakes.

# Lines of Light Construction

The track structure of the standard gage roads, even on main lines, permits maximum axle-loads of only from 13.2 to 14.3 tons (on few lines as high as 16.5 tons). Some of the lines, rated as secondary or local, do not permit an axleload exceeding 9 tons.

Some lines rated before the war as local have, by reason of boundary changes and the desire of each small country to keep its traffic within its own borders, today to perform duties of main lines and the strengthening of the track to suit them for axle-loads of 15.4 tons and running speeds above 25 miles an hour is one of the tasks in the reorganization of the Jugoslav standard-gage railroad system.

The track structure of the narrow gage lines permits everywhere an axle-load of 8.8 tons.

The rails on standard gage, as well as narrow gage, line is today entirely of soft Bessemer or Martin steel. weight of standard gage rails varies, according to the line, from 59 lb. to 60.9 lb. and 70.9 lb. per yard. The narrow gage rails weigh 35.4 lb. on adhesion lines and 43.6 lb. on rack sections. The cross-ties are of treated oak, beach or pine, or of iron or steel. The number of ties per mile varies on standard-gage roads from 1,650—the general numberto 1,800 on secondary lines, and on main lines the number of ties per mile is as a rule 2,060. On narrow gage lines there are 1,965 ties per mile on adhesion sections and 2,090 per mile on the rack sections.

The roadway of all the railways in Jugoslavia is in very much deteriorated condition because of the heavy traffic during the war and the absence of proper maintenance during that time. On the Serbian lines, which were in the center of military operations, the deterioration is greatest. There nearly all bridges and other structures have either been completely destroyed or badly damaged, and after the armistice they had to be replaced by temporary wood or steel structures or by other makeshift means. Since then the restoration of the railroads has been in progress. The Jugoslav State Railway Administration some time ago planned to strengthen gradually the track structure of all main lines so as to fit them for axle loads of 22.5 tons and maximum running speeds of 50 miles per hour.

With the exception of 140 miles of double track, from the Austrian to the Italian border of the Vienna-Trieste line of the Southern Railway, all lines are single track, with passing accommodations every seven to ten miles. Each of these locations has from two to six sidings of an average length of 1,300 to 1,400 feet. All stations are also provided with loading platforms of an average length of 500 ft. To every nine miles, approximately, there is one water storage tank. All the larger stations and junctions have ample freight and passenger facilities; also enginehouses and repair shops.

## Types of Locomotives

Of the standard gage locomotives the following three types are most representative:

1. Type 2-10-0; Cylinders—2 high pressure inside, 2 low pressure outside, diam. 14.56 in. and 24.8 in., stroke 28.34 in. Diam. of driving wheel 57 in. Total weight, 77.2 metric tons; weight on coupled wheels 67.4 metric tons. Grate area 49.5 sq. ft., total heating surface 2,777 sq. ft. of which 678 sq. ft. are contributed by the superheater. This locomotive can haul 1,300 metric tons gross at

superheater. This locomotive can haul 1,300 metric tons gross at a speed of 28 miles per hour on a grade of 0 to 0.3 per cent.

2. Type 2-6-2; Cylinders—2 high pressure inside, 2 low pressure outside, diam. 4.56 in. and 24.8 in. stroke 28.34 in. Diam. of driving wheel 71.2 in. Total weight, 68.9 metric tons; weight on coupled wheels 42.9 metric tons, total weight with tender 107.9 metric tons. Grate area 43.2 sq. ft., total heating surface 2,775 sq. ft. Boiler pressure, 220 lb. per sq. in.

These two types belonged formerly to the Austrian and Hungar.

These two types belonged formerly to the Austrian and Hungar-

ian State Railways.
3. The locomotives of the Serbian State Railways, including those of the lines of the former Oriental Railway and the Macedonian Railway are in general of the 2-4-2 type, coupled with a three-axle tender and a maximum total adhesion weight of 42.7 metric tons without tender.

The locomotives of the narrow gage (30 in.) lines can be classified into four principal types:

- 1. Rack locomotives, types 0-6-0, 0-6-4 and 0-4-0 + 0-6-0: Mallet-compound, with service weights of 30.3, 36.8 and 39.5 metric tons without tender, a maximum 18,000 lb. axle-load on drivers; two inside and four outside high-pressure cylinders: 250 to 350 h.p. performance. The maximum running speed is 18.7 miles are hour and the maximum pressure cylinders 24 dec. per hour and the maximum permitted curvature 24 deg.
- 2. Radial locomotives, types 0-6-2, 0-10-2, 2-4-2 and 0-6-0; 200 to 300 h.p. at steam pressure of 195 lb. The 0-6-0 has one high-pressure and one low-pressure cylinder of 13.38 in. and 20.47 in. diameter, stroke of 17.71 in. Wheelbase is 9.9 ft., three coupled radial axles; the driver of 35.4 in. diameter is 8 in. broad and with-

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out flanges so as to be able to adapt itself to the curvature of the track. Weight 19.5 metric tons; tractive effort 11,738 lb.

3. Express locomotives, 2-4-2; two coupled cranked driving

3. Express locomotives, 2-4-2; two coupled cranked driving axles with 8-in. broad wheels without flanges, with a lead and trail axle. Wheelbase 14.7 ft., radial type, connected by guide links with the drivers to take the guide on the rail; two high-pressure cylinders; Smith system superheater; 350 h.p. performance. With two-axle tender has a service weight of 33.9 metric tons and a tractive effort of 4,600 lb. Maximum speed 28 miles per hour and a maximum superheater; 34 deg. effort of 4,600 lb. Maximum speed 28 miles per hour and a maximum curvature, 34 deg.

4. Mountain locomotives, with 42 metric tons service weight and

a tractive effort of 12,169 lb.

## Severe Speed Restrictions

The maximum speed allowed on level tangent sections of the so-called express lines on standard gage roads is 40 miles per hour, but the average speed on the longest run never ex-The maximum speed permissible through stations is 22 miles, because of the somewhat sharp curves at the switches. The average speed of standard gage passenger trains is approximately 18.5 miles. On narrow gage lines the maximum speed permitted is 22 miles an hour on adhesion stretches and 8 miles on the rack sections. The inclusive speed of narrow gage passenger trains never exceeds 17.0 miles per hour.

On standard gage lines the maximum load of a passenger train is 190 tons; and that of a freight train 640 tons, with a running speed of from 10 to 15 miles per hour. average paying load of a freight train seldom exceeds 250 tons. The average haul for freight is 55 miles and for passengers 18 miles.

On narrow gage lines the fast passenger trains are generally composed of one or two radial locomotives, one baggage car, one mail car and five passenger cars of the fouraxle type, a total weight of train without engine of 80 tons and a length not exceeding 320 ft. Their maximum service running speed is 20 miles with an average inclusive speed of 15.6 miles. The load on an average freight train seldom exceeds 90 tons. Trains of 250 tons require on rack stretches one hauling and two pusher locomotives.

The maximum traffic capacity of the standard gage roads varies according to the particular line from six to seven trains daily each way, to nearly double that amount on the However, even in normal times before the principal lines. war only about 75 per cent of that maximum traffic capacity was ever attained. Today, because of the bad condition in which the war has left them, the maximum traffic capacity of the standard gage roads is not higher than from 35 per cent to 60 per cent of the pre-war maximum attained ca-

For operative and administrative purposes the railroads have been divided into four administrative and operative divisions with headquarters at Belgrade, Subotica, Zagreb and Serajevo.

### The Belgrade Division

The Belgrade division has a total mileage of 591.1 miles of standard gage line and 396.3 route miles of narrow gage. This division includes all the railways of the former Kingdom of Serbia (standard gage), the privately-owned lines (narrow gage) and the standard gage Orient Railway and Macedonian Railway.

The principal and main line of this division is the line running from Belgrade through Nish and Skoplje to Gevgeli on the Greek border (330 miles). From Gevgeli the road runs another 50 miles through Greek territory to its terminal at Salonika on the Ægean sea. Treaty arrangements with Greece concede the passage of Jugoslav goods to the harbor at Salonika free of duty.

The projected lines of importance on this division are:

- From Uzice to Vardiste, 30 miles, narrow gage. Work on this line was begun in 1922 but abandoned in summer of 1923.
- 2. A narrow gage line starting at Kralyevo on the Krusevac-

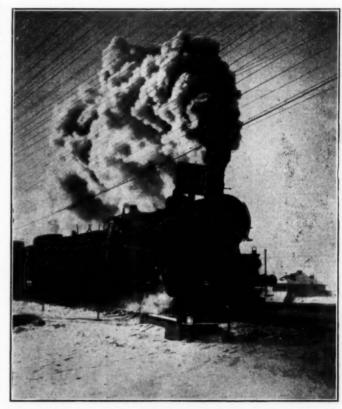
Uzice line southward to Raska and Mitrovitza, there to connect with standard gage line from Mitrovitza to Skoplje. From Mitrovitza the line is projected to run to Uvac where it would connect with the Bosnian system. Work on that project has already begun.

3. The extension of the line from Antivari to Virbazar to join

the Bosnian system at Ustipraca.

## The Subotica Division

The Subotica division has a standard gage mileage of 1,002.9 and includes all the roads north and east of the Danube river. The system is well developed with the exception of connections across the Tisa river, which splits the system into two halves. The general direction of the lines is from the Hungarian border to the Danube river in north-



A Ten-Wheeler at the Head of an Express Train on the Southern Railway

south trend. The main line is the section from Hungarian border to Novi Sad on the line from Budapest to Belgrade.

#### The Zagreb Division

The Zagreb division has 1,944 route-miles of standard gage line and includes the Slovene railways between the Austrian and Italian borders, the Croat railway system and the Dalmatian railways.

This division has the following main lines:

- 1. The double-track section of the Vienna-Trieste line of the Southern Railway from the Austrian border to the Italian border.
- 2. The line from the Hungarian border to Zagreb, thence through Karlovac to Fiume.
- 3. The express line from Lubljana through Zagreb to Belgrade.

The most important construction projects on this division already under way are:

- The extension of the existing Ogulin-Gospic line through Pribudic to Knin, where it would connect with the line from Knin to Shibenik and Split.

  2. The so-called Unna line connecting the Croat railway termi-
- nal at Krupa through Bihac with Pribudic where it would connect with the projected Gospic-Knin extension.

3. Completion of the line from Karlovac to Lubljana by the construction of the section from Karlovac to Cernomelj.

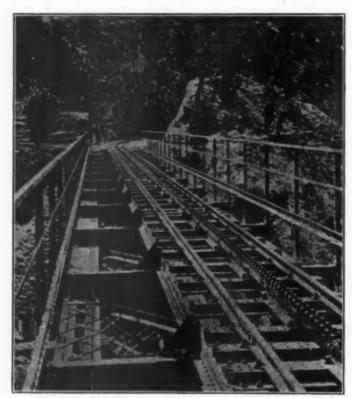
This line, together with the Gospic-Knin and Bihac-Knin lines, would giv standard gage rail connections with tide-water to the western part of Jugoslavia. Their tide-water terminals would be the splendid harbors of Shibenik and Split which could easily be developed as ports of registry of the Jugoslav merchant marine. The harbor of Shibenik is situated on a bay which penetrates fjordlike inland for 12 miles where it enlarges into a lake about three miles long and two miles wide—with great water depth up to the shore line.

## The Serajevo Division

The Serajevo division includes the narrow gage lines in Bosnia and Hercegovina. Its total mileage (in 1921, the latest figure) was 623.7 route miles in operation, 106 miles in construction and 104 miles projected.

# How the Thirty-Inch Gage Was Adopted

The 30 in. gage of this system was adopted by an accident. When, after the Berlin treaty, by which it obtained the mandate to occupy Bosnia-Hercegovina, Austria-Hungary had



Bridge on Rack Rail Section, Narrow Gage Lines

its troops advancing in the Bosna valley, the need of railway communication was felt. The only material available was that of a contractor who had just finished the construction of a standard gage line for the Hungarian State Railway. It consisted of some 30 miles of rails and ties and a couple of contractor's locomotives. With that material the line of contractor's locomotives. was laid and operated. Military necessity required extension and the heavy supply traffic forced improvements in the track, which from the start was intended to be of standard gage up to Serajevo. The low cost in construction, the low expense in operation and the carrying efficiency the road developed, however, induced the military authorities in charge of the administration of those two provinces to retain the narrow gage system; exceedingly well suited for the highly mountainous country. And thus, slowly, the temporary track was replaced by permanent track and the 30-in. railway developed so as to cover the two provinces with a net work of lines, which were extended to provide the system with tidewater terminals on the Adriatic. In regard to track structure,

it is one of the best built roads. The idea in its construction, in permanent form, was not to fit the cost to its probable earning capacity but was military first, designed to withstand the strain of the heaviest military traffic, passenger and freight, under war conditions.

The main line of this system runs from Brod on the Sava river, where it connects with the standard gage Croat railway, through the valley of the Bosna to Serajevo, the capital of the province. From Serajevo it runs to the harbor of Gruz on the Adriatic.

Some construction projected on these narrow gage lines is outlined below:

From Serajevo eastward runs the so-called Eastern Bosnian railway, a line constructed as a main line for military strategic purposes principally, with a terminal at Uvac and a branch terminal at Vardiste. From Uvac an extension has been projected to run to Mitrovitza to connect there with the Mitrovitza-Salonika line. The terminal at Vardiste is to be linked with the Western Morava narrow gage line by the 30-mile stretch from Uzice to Vardiste now under construction.

About 50 miles north of Serajevo, on the Brod-Serajevo line section of the road, a line is projected as a main line to sink up on one hand this system with the tide-water harbors of Shibenik and Split, and on the other hand to connect the Banjaluka standard gage terminal of the Croat State railway via Jaice and Bugojno with the Serajevo-Metkovich line. Part of this projected line is constructed and in operation.

# The Future Route of Traffic in the Balkans

As has already been stated the natural trend of trade routes on three-fourths of the territory of the state of the Serbs, Croats and Slovenes is not towards the Adriatic; its river systems and its water level rail routes lead either towards the Black sea or towards the harbor of Salonika on the Ægean.

In order to appreciate the meaning of the Salonika situation, let us consider the centers of European industrial and commercial activity, based on pre-war conditions, whose raw products come from the East and whose manufactured products went to the East as a principal market, and connect the points of maximum intensity in respect to the Suez canal route. Thus we obtain a line which could be called the line of European economic gravity in respect to the Suez; this line starts in Great Britain at Glasgow and passes through Birmingham and London; crosses the North sea into Holland; thence into Germany where it passes parallel with the river Elbe; crosses Bohemia; touches the Danube and thence continues along that river, which it crosses to traverse Serbia entirely; it runs through the valleys of the Morava and Vardar on to Salonika and thence across the Ægean sea to Suez-following in the line of least resistance, the nearest approach to a water-level route available.

When Central Europe gets down to business once more and when arrangements have been worked out so that international boundaries are less of an obstacle to the free passage of goods and passengers, it is evident that the route via Salonika will become a great trade route to the Orient. Salonika is a Greek possession, but its feeding hinterland is Jugoslavia. It is taken for granted that Greece understands its own interests and will further this development by all possible means.

# The Harbors of Shibenik and Split

The demand is increasing among both Jugoslav industrialists and producers of raw materials not only for improvement in the railways leading to the great Aegean trade outlet, but also that Jugoslavia must hasten to make the good natural harbors of Shibenik and Split, on the Adriatic coast safely within national boundaries, the tide-water terminals of its own railroad system. The idea is that these harbors would become the ports of registry of a Jugoslav merchant marine and, if provided with an adequate railroad feeding system, could be developed as first-class commercial ports on home soil, free from all international entanglements.



Yards at Moscow

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# Russian Railways Show Some Improvement

Deterioration Has Reduced Value of Lines One Half— Years Needed for Reconstruction

By Sidney Brooks

THE STRAIN on the Russian railways was very severe during the great war and their failures then were keenly felt by the general population. Then, when the whole economic structure of the country was torn down during the period of Bolshevist experimentation, deterioration

States there are about 35 inhabitants for every square mile and there are 24 miles of railways for every 10,0000 people; whereas in European Russia the density of population is 70 inhabitants per square mile and the railway system has only been developed to three miles for every 10,000 inhabitants.

However, the fact that construction of new lines was behind that of economic development gave the existing lines a comparatively heavy traffic on each track, assuring at least full utilization of capital expended in line and structures. In



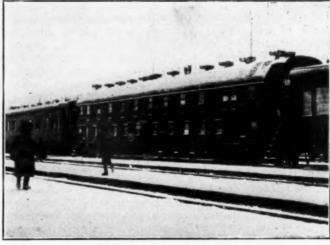
Taking on Fuel in Russia

of the railways became catastrophic. Many of the defeats suffered by the Russian army during the great war were due to the difficulty of moving troops rapidly from one sector of the front to another when menaced by the more mobile forces of the enemy. The inability of the railroads to move troops with facility forced Russia to raise a disproportionately large army for the defense of her extended frontier.

## Railways Insufficient and Overloaded

Even Before the War

At the outbreak of war European Russia with a density of population twice as great as that of the United States had a railway mileage only one-seventh as great. In the United



A Double-Decked Passenger Car at Samara

1913 the density of traffic on all Russian roads was 1,200,000 ton-miles per mile of line, which is a greater density than that of any other country except England. It should be remembered that two-thirds of the Russian lines are single-track, whereas in England most of the railroads are double-track and not a few four-track, so that, actually, the density

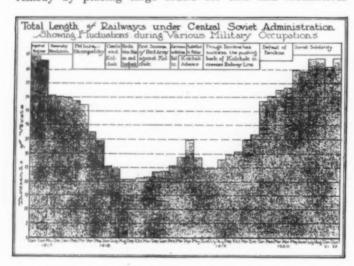
of traffic on each track in Russia was greater than that of any other large country in the world.

Notwithstanding this heavy density of traffic the low efficiency of Russian railroads in relation to others is indicated by the fact that there were twice as many employees compared with tonnage hauled as on the lines in the United States. On American railways there are about five employees for every million ton-miles of freight handled, whereas in Russia in 1913 there were ten.

# Equipment Shortage Progressively More Acute

During the early period of the war the authorities undertook considerable construction but all of it was primarily for military purposes and only incidentally or by chance were the lines those required for economic needs. Shortage of cars and locomotives began to be felt at the beginning of the war and progressively became more acute as the war went on. Many expedients were resorted to, such as curtailment of trains, withdrawing equipment from branches, and increasing the size of the trains beyond the point which light rails and ballast permitted.

The insufficiency of equipment the government tried to remedy by placing large orders for cars and locomotives



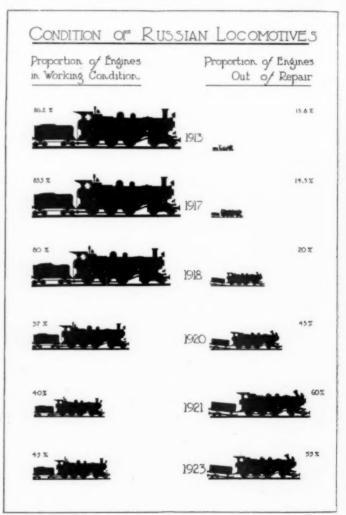
abroad, principally in America. Determined efforts were made to increase production of Russian equipment works, but without much success. In the nine years since the outbreak of war railway repair shops only rarely have had equipment added or renewed. Besides extremely heavy railway work, the shops were called upon to manufacture large quantities of war material, ammunition and engineering supplies. The Putilov works, the largest locomotive works in Russia, were devoted to manufacture of war materials. The state of the equipment of the railway repair shops, particularly smaller shops and engine houses on branch lines, became very bad.

### Soviets Make No Change in Operating Methods

At the beginning of the Kerensky revolution the situation of the railways, though difficult for a country engaged in a great war, was nevertheless not woefully bad for Russia at peace. During the first stages of the revolution questions of repair of equipment, and, of course, those of general improvements, were ignored under the pressure of more stirring political events. The number of disabled cars and locomotives began to increase rapidly until the necessity of ordinary maintenance was lost to view in the pressing problem of saving the railroad apparatus from total disintegration. Then came the Bolshevist revolution and what before had looked bad paled into mild trouble in comparison with the increasingly rapid pace of disorganization accompanying the ascendancy of the Soviets.

Nationalization of Russian railways by the Soviet state constituted no novel social experiment, as did the nationalization of industry. In fact, under the railway charter rights reserved by the old Imperial Russian government their nationalization can be considered as the assumption of a right reserved in advance, although this prerogative had not been contemplated without the payment of compensation to private owners.

As nearly three-quarters of the Russian railways before the revolution had been constructed and operated by the state, and as the imperial government had full rights of control over private railways, participating in dividends, intervening in



financal questions, guaranteeing bond issues, and occasionally dictating in operating questions, no general reorganization was necessary at the time of nationalization under the Soviet power. The railways, aside from general economic changes, ostensibly functioned as always, retaining old employees, their administrative staffs, and most higher directors.

# Railways' Deterioration Due to General Industrial Stagnation

The revolutionary regime received a heritage in the rail-ways of a solidly established machine, directed by specialists and already more or less well managed by the state. Running the railways was a purely technical job, hardly affected by socialistic or Marxian principles. Neither the facilities nor the competence of experts was lacking. The dislocation and descent of the Russian railways after the fall of the monarchy happened not primarily because of any new principles applied to management, but because of general dissolution of the whole economic life of the country, and of the inevitably

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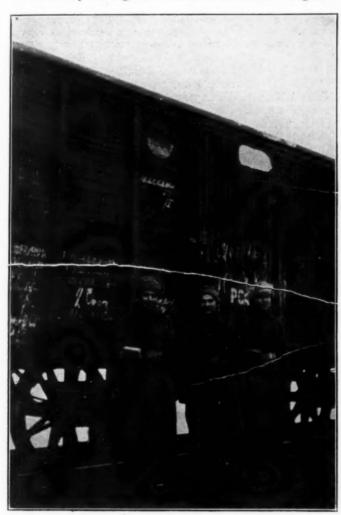
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ensuing industrial poverty which afflicted every part of the industrial structure. The rapid stoppage of all industry started with the coal and metal mines and extended clear through the middle processes—the heavy metal industries—to the more specialized manufacturing branches. The gradual effect on railways was that it was impossible for them to get the supplies or the manufactured parts essential for repair work.

Although under the new management there were many administrative faults and numerous grave mistakes of policy, these were not generally the results of socialistic principles applied to railways, but those of inexperience, incompetence, or negligence in guiding policies. The old staffs were retained, but inevitably the highest direction and dictation of general



Bolshevist Soldiery Guarding a Food Train

policies was taken over by members of the new political dictatorship. Ruin came to Russia's railways, but to say it was brought primarily by errors of railway management would neither be just nor would it be accurate. Their breakdown came as the direct result of shortage of repair materials -the parts for locomotives and cars, rails and ties for replacement. Direct errors of management only served to make the situation worse. This shortage of material was due to the downfall of industry, to be sure, and to the breakdown of the economic machinery of this great country, but this was beyond the province or power of the railway administration to repair. Secondarily, the next serious trouble was disorganization which came about in the railroad repair shops, and the greatly fallen state of efficiency and productiveness of labor itself that followed in the wake of the workers' revolutionary access to power.

For instance, introduction of shop management committees brought a powerful influence of men wholly devoted to measures beneficial to the workers, such as shorter hours, restricted output, and all that could be calculated to remove irksome discipline. Man production immediately fell to at least 30 per cent of its former state, and shop production fell even further due to the unco-ordinated shop processes that came with inexperienced and divided control of bodies of workers grouped into controlling shop committees. Shop production was further lowered by the frequent inability of the government to pay wages or provide the workers with food, in consequence of which many deserted their posts and left for other parts where they thought life would offer more allurement.

# Shops Slightly More Efficient

Many parts required for locomotive and car repairs had been fabricated not in railway shops, but in private railway equipment plants, some also being supplied from abroad. Supply of these was suddenly cut off, not only from the foreign manufacturers, but by the disruption of private manufacturing plants in Russia. Frequently railway shops were able to make most of the repairs to a certain locomotive or car but, lacking some necessary part, were still unable to put it into service. In order to get some of these locomotives into service, others waiting for repair were stripped of essential parts, so that when the time came to repair them, they were found to be little more than skeletons. also true in a less degree of car repair. The state of the shops, the buildings, power, water supplies, and the shop requisites, was and is far from satisfactory. Their productivity in 1921, due to the pressure of the necessities of repairs, had been raised and was much above that of general industrial plants in Russia, but stood at only 50 per cent of that in 1913. Now it is slightly higher, about 60 per cent.

This situation would have been bad enough under conditions of normal wear and tear, but coming at a time when much of the equipment was demolished or damaged by destructive military operations, it was extremely serious.

# **Equipment Conditions**

At the outbreak of war there were about 20,000 locomotives on Russian railways, only 13.8 per cent of which were out of service undergoing repair. During the war years vigorous methods kept the proportion of locomotives out of service from seriously increasing, there being in 1917 but 14.5 per cent out of service. After the Kerensky revolution and at the beginning of the Bolshevik period locomotives out of repair had increased to 20 per cent. After two years of communist rule, by January, 1920, there remained only 13,700 locomotives on railways in the Soviet territory and those out of repair had increased to 6,000, or 43.7 per cent. From then on, disabled locomotives taken from service continued to increase month by month until at the outbreak of famine in July, 1921, over 60 per cent of the locomotives were waiting for the repairs.

Of the 480,000 freight cars on Russian lines before the war, but 5 per cent were normally in process of repair. Sliding along the same downward course as the locomotives, the proportion of disabled cars in 1917 was 8 per cent; in 1918 12.4 per cent; by 1919 it had increased to 18 per cent; by the middle of 1920 it was 23 per cent; at the beginning of the famine in July, 1921, it was 30 per cent.

Of all the pressing problems confronting the railway administration that of locomotive repairs was the worst—the worst both in degree and in complexity. Utter ruination of the railways, so that hardly a locomotive could get up steam and hardly a train could be moved, stared the communist leaders in the face.

It is true that the repair of locomotives was the key to the situation, but had it only been the organization of repair of rolling stock that confronted the authorities the situation would not have been nearly as dark as it was. The same

evils that attacked the motive power of the railways also undermined every other department.

## Deterioration of Roadway and Track

First, about three-quarters of the railway lines of Russia during the revolution and civil wars that followed from 1917 to 1921 were in the areas fought over by the various forces. According to data collected by Russian engineers, 77 per cent of the lines were at one time or another out of operation, owing to physical destruction of track and bridges along some part of their divisions. The Commissariat of Transport reported that 3,011 railway bridges and other engineering structures were destroyed during the wars; of these only 1,481 had been rebuilt by 1923 and 1,500 but temporarily repaired.



A Russian Freight Conductor

As to the condition of the permanent way, it was officially estimated that 30,000 miles of track were destroyed, but it is difficult to state this correctly because relaying of track was carried out throughout the whole period in conjunction with military operations. On some of the lines 30 to 40 per cent of station buildings and other structures were destroyed.

If we draw a map and shade those areas covered by these military operations, the only unshaded or peaceful areas are those immediately around Moscow in the center, certain parts of the unpopulated north, and the larger part of Siberia, as well as the thinly settled sections of Southeast Russia. Every time some military body retired along a given line, it sought to check the advance of the opposing force by severing the line of communication, tearing up rails, burning ties, bridges and equipment. Occasionally, when retreats were precipitous, there was no time for this, and sometimes only

small sections were torn up, but usually the damage wrought to the line was pretty serious. This is the dramatic side of the destruction.

A less spectacular damage was slower but surer, day-by-day wear and tear on rails, ties and ballast, unrelieved by the constant attention needed. When rails wore out, ties rotted and ballast sagged, they had no attention and were not replaced until they absolutely gave out. When imperative repairs were undertaken it was naturally found they were many times as difficult than if they had been immediately attended to.

Lack of new rails and the rapid deterioration of the lines without replacements caused Russian engineers in some cases to tear up one track of a double-track section in order to keep the line open at all. Good rails and ties of the torn up track were used to replace those worn out on the other. Other large sections were torn up to furnish material for construction of new strategic lines and fuel carrying branches, most of which are of little use for peace traffic.

Before the war normal rail replacement was 2,000 versts (about 1,300 miles) per year. Since 1917 the rails re-layed averaged not more than 100 versts per year, until at the end of 1922 over 13,400 versts urgently needed complete rail replacements. A complication is the fact that work of systematizing the types of rails begun in the nineties was not completed by the time of the outbreak of the war, so there is now to be found a wide diversity of types and sizes used on any given line, even main lines. The average age of the heavier rails is from 12 to 15 years, but that of the lighter rails is from 40 to 50 years, or from 7 to 17 years past the age of safe serviceability.

### Great Potential Supply of Ties

One of Russia's most accessible riches is the timber in her One of the most acute needs was railway ties. Felling trees and hewing them into rough ties is an operation of the simplest sort, yet tie replacement declined immediately with the revolution and thereafter kept falling so rapidly that by the end of 1922 half the ties on the lines of Russia were so rotten or damaged as to require replacement. To keep the railway lines in a good state of efficiency formerly 30,-000,000 ties had to be replaced every year. The replacements in 1917 were about a third of this, in 1918 almost nil, and in the next four years were only a fraction of those required. In 1922 railway chiefs estimated that 44,000,000 new ties were vitally needed and this was only on the basis of supplying the most important lines with 50 per cent and the less important branches with but 20 per cent of their real needs. Actual tie replacements in 1922 were 10,500,000, or one-quarter of the most urgent need. The program for 1923 was 20,000,000, but only half have been supplied. With the best possible efforts it has been calculated that the tie situation cannot be brought back to normal until 1935 or 1940.

Large expenditures are necessary for repair and replacement of water supply facilities, which naturally have very much deteriorated along with all other equipment. Locomotives have naturally seriously suffered from use of scale producing water.

## Fuel Troubles

Not the least of the operating troubles was the fuel supply. Of the 7,000 serviceable locomotives at the beginning of the famine, about 1,500 were out of service because of lack of fuel. The majority of those in service were being run on wood fuel, much of which was green or had been lying exposed to rain, snow and ice, making it at best a poor combustible. Such fuel played havoc with fireboxes, tubes, and grate bars, particularly of those locomotives designed as coal burners but which were using wood because of coal shortage.

In 1913 coal constituted 65 per cent of the fuel used on the Russian railways, but with the great decrease of mine ght

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production, it had dropped by 1921 to only 27 per cent of the fuel used. On the other hand, although only 13 per cent of the fuel used in 1913 was wood, in 1921 wood made up 44 per cent. This shows approximately the proportion of coal burning locomotives which by 1921 were using wood. Any engineer knows what this means in combustion inefficiency. In heat units more than twice the amount of fuel was consumed on Russian railways in 1922, in comparison with the work done, as before the war. The fuel used per verst run, converted to and expressed in cubic sajens\* of wood, in 1913 was 1.25; in 1920 it was 2.11, and in 1921 it was 2.72. In the light of the great fuel scarcity this waste was serious. One of the worst features of the fuel situation was the constant failure of locomotives on the road causing blocks and delays to traffic which greatly intensified the shortage of supplies in cities and non-producing sections of the country.

# Half of Railways' Value Has

# Disappeared Through Deterioration

An index of the damage suffered by the railways and the effort necessary to restore them is obtained in the estimate of Russian experts that restoration of line, shops and equipment of lines of primary importance, to be fitted for a normal traffic would cost about 760,000,000 gold rubles (gold ruble =51.46 cents). To meet only one-third of the requirements of the secondary lines would require 179,000,000 gold rubles. Thus the total required to get the railways back to workable condition would be about \$477,000,000. The total capitalized value of all the Russian railways was about \$1,200,-000,000. Some of these lines are now outside of Russian boundaries; so if only imperative repairs are to cost \$477,-000,000 it can be seen that war, civil war and neglect have caused the destruction of more than half of the Russian transport machine. Under the best of conditions it will be possibly two generations before the country has transportation even equal to that of the old empire.

## Railways Run by Employees' Sacrifices

Since the revolution the railroads' financial predicament has been so bad, deficits so great, that they have been kept running only by the sacrifices of their employees. Underpaid, or not paid at all, hungry and ragged, these men stuck to their posts and kept trains running. Expressing it financially, the Russian railways have been operating for several years on the credit of their employees and by the exhaustion of their equipment. Ranks of employees were depleted, first by conscription to the army and later by desertions, for their duties were of a most rigorous nature. These desertions, however, did not assume general proportions, partly to be sure because there was no place else to go in Russia where conditions were any better. Much more serious than the desertions of some of the staff was the effect of the lowered morale among the bulk of employees; half-starved, cold, worn from fatigue of overwork and undernourishment, human efficiency went down to half what it had been. The Russian railwayman, generally, with all his faults, performed his duties in a spirit of self-sacrifice that should live in Russia's history.

Thus the activities of the railways gradually died, equally because of inability to handle traffic, and because of the decrease of goods and supplies to be transported. Even so, throughout the revolution there remained large quantities of products to be transported for government institutions, particularly to food distributing centers, as well as supplies and material for the army in the civil wars. The condition of the railways made it impossible for them to accomplish even this most primarily essential work, and those goods that were carried were only transported under the greatest difficulty. The food supply of the population and the supply of fuel

for the needs of industry and inhabitants decreased to an extremely low figure. Those in cities suffered from hunger and cold, intensified by the paralysis of the railways. In 1913 Russian railways transported nearly 300 million tons. By 1920 traffic had fallen to less than 60 million tons. Then in 1921 the great famine came. The story of the battle of the railways in mid-winter to move the huge quantities of relief supplies brought by Mr. Hoover's organization is one of intense interest.

# Some Improvement Made at Last

Beginning with the appointment of F. E. Djerjinsky as Commissar of Ways of Communication early in 1922, an improvement in the situation of the railroads began to become noticeable. Djerjinsky, it may be recalled, was the chief of the Cheka, or secret police, held more in fear and dread than any man in Russia. Restrained in manner, quiet and courteous in speech, his mild eyes betray none of the terrible characteristics ascribed to him as the supreme directing force of the Red Terror. But his reputation is world known. Although not a railway man, the same force that brought him doubtful renown as chief of the secret police succeeded in untangling the railway snarl, arresting their rapid downward course, and starting them up on the road to recovery.

Outward indications soon showed a marked improvement.



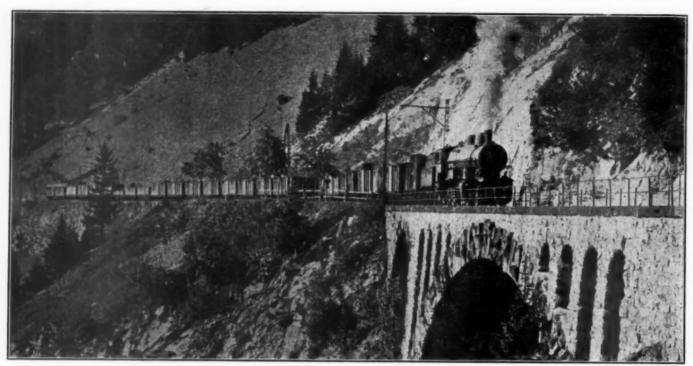
Occasionally a Locomotive in Excellent Condition Is Seen

Through passenger expresses appeared once more, their equipment cleaned up, sleeping cars with clean sheets added, and dining car service re-installed, to the great astonishment of all. No dining car had been seen for five years. These trains now are generally on time. Their schedules are very easy, but the fact that there was prompt service made a great impression on the populace, accustomed, as they were, not even to know what day a train would leave, or if it would ever arrive at the end of its run.

To the casual observer, these improvements were phenomenal, but of course this was the showy side. Fundamentally, the railways have hardly started on the difficult upward climb, but the important thing, for Russia, is that they have started. During 1922 and 1923 locomotive and car repair work was restarted in a more determined way and the number of locomotives needing repair decreased from 60 to 50 per cent, the percentage of bad order cars decreasing from 30 to about 22 per cent. More ties were secured, but little was possible in rail replacement as few new rails were procurable.

Now, slow improvement is taking place, the railways are in much better shape than any Russian technical industry. The famous School of Ways of Communications at Petrograd is still turning out a certain number of graduates, and although its curriculum has not the former severity, it is providing technical engineers for all branches of the service who are to start the rebuilding of a working mechanism.

<sup>\*</sup>One cubic sajen equals 12.7 cubic yards.



An Austrian Freight Train-the Locomotive Is a Decapod

# Rigid Economy the Watchword in Austria

State Lines in Charge of Directorate Like Private System— **Electrification Progress** 

By A. Niklitchek

HE TOPOGRAPHY of Austria is highly unfavorable for railway construction. The country is very mountainous and most of the mountain passes are tell m ous and most of the mountain passes are very high, centages of grades and curves to level track and tangent are shown in the following table.

EXTENT OF GRADES AND CURVES

Gradient	Curvature
Level 1	19.2% Tangent 61.3%
Up to 1%	58.7% Up to 3°37'
Over 146.	

These conditions are even more rigorous than those the Swiss railways have to face. Moreover, the Austrian mountains are very poor in minerals and consequently provide the railways with little heavy traffic. The tourist traffic in summer and the transportation of wood fuel are insufficient

to provide a remunerative year-round business. The estimated deficit of the Austrian State Railways for the year 1923 has been given as 1,318 billion paper crowns (about \$18,828,000). Although the great majority of all continental European railways are working under heavy deficits, it is difficult for a state as small and as poor as Austria to bear such a one as this. With the help of the League of Nations, however, Austria has stabilized her currency and, also with the help of the League of Nations, is working hard at reconstruction. Naturally the railway deficit looms large among the problems pressing for solution.

In order to get a competent and impartial statement of the peculiar conditions of the railways, the commissioner of the League of Nations invited the well-known British railway expert, Sir William Ackworth, to study the Austrian railways and to give his opinion as to what should be done with them. Sir William complied with this request and enumer-



Austrian Passenger Train Drawn by Electric Locomotive

ated the disadvantages under which the railways were working (in addition to the natural handicaps mentioned above)

First of all the state railways were not productive of profits because of the 30 per cent traffic tax. Furthermore,

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they rendered important and expensive services for the post office administration for which they were inadequately compensated. Duties were imposed upon the railway administration which were not connected with railway operation. Unprofitable lines were kept in operation and contributions were made to non-functioning private lines.

The chief trouble, however, was to be found in the organization, which was much too large and unwieldy and therefore worked slowly and inefficiently. The railways with a total staff of 90,000 employees had about 27.2 officers and men per mile of line, which number was ridiculously high and surpassed any other European railways (Switzerland 19.2, Germany 21, France 14.5, United States less than 8 per mile). In the same way the application of the 8-hour day worked very badly, since in reality many employees worked much less than 8 hours.

Moreover, the program for new construction, except electrification, was much too ambitious. With a more efficient organization, however, and rigid economy conditions should improve in such a manner that after a lapse of a few years the deficit should disappear entirely.

## Reorganization Begun

Sir William's opinions and recommendations were approved and reconstruction has been energetically begun. Parliament has passed a law placing the whole railway administration on an entirely new basis. Instead of a ministerial administration, a directorate resembling that of a commercial undertaking has been placed in charge. This consists of a general director at the head of a kind of board of governors. Accordingly, the railways are no longer a direct organization of the state, but they are a quite separate enterprise. Working forces will be reduced to a reasonable size and plans for improvements are to be shelved for the greater part, to be carried out only where they have been com-

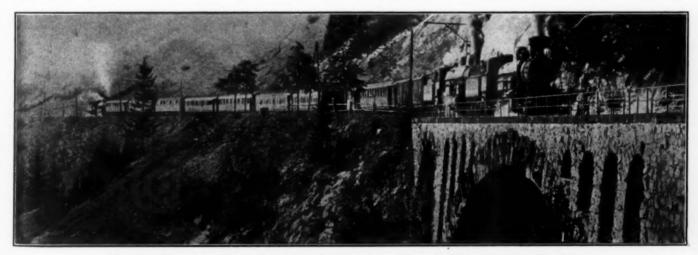
motives averaged only 13,600 miles, a relatively insignificant performance, due largely to the heavy repairs always necessary with the more or less antiquated types of power. But the ratio of unserviceable locomotives to the whole stock is decreasing continually because of the improved performance of the repair shops, of which there are nine, employing a total of 14,700 men. The electrification of two



Austrian Churchyard with Railway Viaduct in Background

main lines will replace many modern steam locomotives which will be used elsewhere in place of older power.

A study of the records of fuel consumption shows that the poor record is due to the inefficiency of the antique types of power. The Austrian State Railways report a coal consumption of 153 lb. per mile. A comparison with the



Express Passenger Train Near Summit of Arlberg Line, Austria-Grade, 3 Per Cent

menced and are so far advanced (as, for instance, electrification) that a cessation of operations would entail the loss of large sums already invested.

## Physical Condition

The greater part of Austria's railway lines are of light construction; only 23 per cent of the total mileage will permit an axle load of as much as 16 metric tons, while the rest permits only 14.5 metric tons. These insufficient wheel loads set up great difficulties in the way of efficient handling of heavy traffic.

At the present time the Austrian State Railways have 2,661 locomotives (0.8 per mile). The supply of power is consequently comparatively good. Since 1918 the railways have ordered 362 locomotives. The past year, these loco-

reports issued by the Swiss Federal Railways shows a much higher consumption of fuel and lubricants in Austria, although the conditions of traffic are nearly the same for the roads of both countries.

## Modernization of Motive Power Curtailed

Because of the bad financial situation of Austria, the comprehensive plan for the modernizing of motive power must be reduced greatly. The last year the Austrian State Railways ordered only 15 heavy Decapod type locomotives and 27 heavy 4-8-0 type express passenger locomotives. Both types of locomotives are fitted with the new Lentz poppet valve gear and the Dabeg feedwater heater. The steam required for this heater is taken from the exhaust of the cylinders and admitted to the heater after having passed an oil

separator, in order that its condensate may be oil-less. The feed-water pump is actuated by the valve gear.

The Austrian State Railways have 5,021 passenger cars (1.51 per mile) the greater part of the four-wheel type. No new passenger cars were acquired during the past year. Freight cars to the number of 33,041 (10.2 per mile) are owned, of which the greater part are four-wheeled, their average capacity ranging from 10 to 15 metric tons. Because of the precarious financial situation, no new freight cars could be ordered.

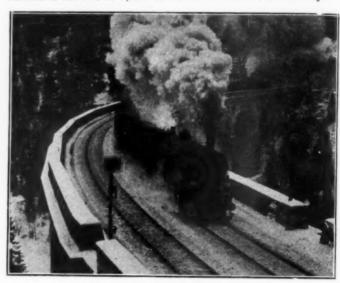
Freight traffic has fallen off, only four-fifths of the prewar average having been handled last year over the lines owned by the present Austrian state. Passenger service is of nearly the same density as it has been since the war. In pre-war days, fuel costs were only 7.5 per cent of operating expenses; today, they have increased to 18 per cent. As in other countries, the cost for operating the railroads are much higher than prior to 1914. A commensurate increase in rates and fares is, however, impossible, due to the poverty of the population.

In 1923 freight rates were increased 28 per cent, while passenger fares are 15 per cent higher. Figured in gold, freight rates are 21 per cent higher than before the war, while passenger fares are cheaper (77 per cent of 1914).

## Electrification

The Austrian National Assembly in 1920, passed a bill to substitute electric traction for steam on the state-operated lines, in order not to be dependent on coal, most of which must be imported, since coal deposits are very scarce in Austria. Electric power for this purpose is to be secured from a number of hydro-electric power plants now being built.

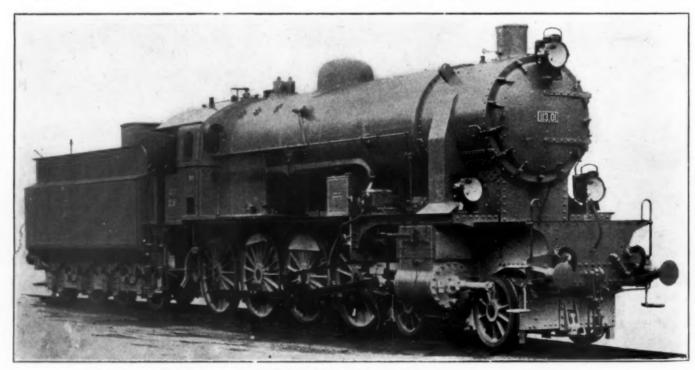
The initial electrification project includes 137 miles with heavy gradients from Innsbruck to Bludenz, and 68 miles approaching the summit). The electrification of the Arlberg line has been completed from Innsbruck to Oetztal (20 miles). The continuation of the electrification depends from the progress in building the Spullersee power station. The station is located at 6,000 ft. above the sea level and is pro-



In the Mountains of Austria

vided with a large water storage reservoir—the pipe line having a fall of 2,600 ft. The complete plant will develop a total of 48,000 h. p.

From the power plant the energy will be transmitted at high voltage (55,000 volts) by a power transmission line over the Arlberg, to the transformer stations. The electrification



A Ten-Wheeler for Passenger Service Equipped with Lentz Poppet Valve Gear

from Attnang-Puchheim to Steinach-Irdning. The famous Arlberg line runs westward from Innsbruck, an important station on the line to be electrified. The maximum grade in this zone is 3 per cent. The line contains a large number of curves; there are also six tunnels (the longest, the Arlberg tunnel, 6.75 miles in length, located on the most severe grade

of these lines is carried out with a single phase alternating current at 15,000 volts.

For motive power 54 electric locomotives will be required for the initial electrification, including the following types: 0-10-0 for freight; 2-6-6-2 for heavy express passenger and 2-6-2 for light passenger service.



In the Swiss Alps-Photo from International

# Germany and Some Other European Countries

Difficulties in Ruhr a Setback for Germany—Steps to Facilitate International Traffic

DURING the past two or three years Europe as a whole has been gradually moving toward more normal conditions in railroading. Agreements have been entered into previding for interchange of cars so that nations no longer hesitate to let their rolling stock cross international



Keystone

Station at Leipsig

boundaries because of the fear that it will never be seen again. Other agreements have been made calling for standard equipment for international traffic, standard accounting and through international rates. All this has tended to facilitate the normal movement of traffic and to minimize the bandicaps of the many new international boundaries which resulted from the treaty of Versailles.

At the present time, however, this tendency toward gradual

improvement has been checked in Germany as a result of the occupation of the Ruhr. The railways of this section, as is described elsewhere in this issue in an article about the French railways by M. Peschaud, are operated by a "Régie" made up of French and Belgians. Between the Ruhr and the rest of Germany there is little through traffic. Under a recent agreement through traffic from the rest of Europe now moves into the area occupied by the British. However, when trains from the British area reach that controlled by the French, trains are stopped and passengers have to change to trains operated by the Franco-Belgian Régie, incidentally buying a new ticket and paying for it in francs. An effort is, however, being made to establish some kind of an agreement under which traffic may be resumed on a more nearly normal basis.

The periodical rumor that the government-owned railways of Germany are about to be sold or leased to private interests has appeared again. This time it is foreign capital, a syndicate of financial interests from various countries, which it is said will take over the lines. Hugo Stinnes, the German capitalist whose name has heretofore been connected with such rumors, is said to be just as desirous as ever of acquiring the lines. These lines, once profitable, are now suffering from heavy deficits which add even greater difficulties to the task of financing the German state, a task which would be severe enough with no troublesome railroad deficit added to it. A considerable number of Germans are starving and the great majority of them cannot afford anything like their pre-war quota of necessities and luxuries. These are not therefore, boom times in railway traffic and the fact that the railways earned profits before the war is no proof that they would do so now. Consequently there may well be some skepticism as to whether the German government could find a private concern which would be willing to take over the railroads under present conditions.

### Switzerland

The Swiss Federal Railways in 1922 again suffered a deficit after fixed charges, although not as severe as in 1921. In 1923 conditions have improved considerably. For the first five months of 1923 gross receipts totaled 85,574,000 francs (\$14,975,000 at present rate of exchange rates), almost twice the figure for the same period 10 years ago. No hope is held out, however, that results for the year will

be good enough to cover fixed charges.

Switzerland's chief difficulty is her high exchange rate. With the Austrian and German currencies worth next to nothing and with French, Belgian and Italian money depreciated about 75 per cent, the Swiss franc has declined only about two cents from its par value of 19.3 cents. Naturally, pleasure-seekers from countries with depreciated currencies cannot afford to buy Swiss francs and so they spend their holidays elsewhere. The consequence is that Switzerland, where caring for tourists is the principal industry, is experiencing an acute business depression. Even with the improvement in business in 1923 the railroads are not handling as large a tonnage as they did 10 years ago. Passenger traffic, likewise, is scant and in order to hold what little traffic there is the railways have had to make considerable reductions in rates. Passengers carried in 1922 showed an increase of half a million over the previous year, yet receipts declined 3 per cent.

Fuel remains high-about four times the 1913 price, although some reduction has been made since 1920. Coal, moreover, is imported and all sums spent for it go to benefit a foreign rather than a home industry. To save fuel, therefore, the Swiss railways are being electrified as rapidly as consistently possible under prevailing financial conditions.

Wages are more than double those which obtained before the war, but owing to high living costs it has not been possible



Yards at Dusseldorf in the Ruhr

to make any considerable reductions in this item, although there has been some reduction in forces.

## Hungary, Roumania, Bulgaria

Hungary is making some progress in restoring her railways, but progress in this direction is seriously retarded by the difficulty of financing the purchase of necessary equip-ment and supplies, particularly fuel, lubricants, ties, rails and shop machinery. The railways are being operated at a heavy loss, but by an experienced administration.

Roumania, by increases to her territories which came as a result of the war, had to weld into her own railway system portions of systems formerly belonging to other countriesa difficult task. Moreover, the lines themselves were seriously damaged during the war and in acquiring additional mileage

Roumania did not acquire additional shop facilities in proportion-a situation which has placed the task of rolling stock reconstruction on shops entirely inadequate.

In Bulgaria passenger traffic is twice what it was in prewar days and freight business is about the same. That this increase in business is being handled is a sufficient proof of improved conditions. The speed of passenger trains is slow, principally because of the poor condition of the track, which cannot be adequately maintained because of an insufficient supply of ties. Freight cars now make only about half the mileage they did before the war and results as satisfactory as have been obtained have been possible only because of



Cologne Station

additions to the supply of cars and locomotives. It is evident, however, that present operations are not efficient. The country suffers from a lack of adequate shop facilities. In spite of these conditions, however, the Bulgarian railways are exceptional in Central Europe in that they are earning profits.

Facilitating International Traffic

On December 6 at Geneva, the Second General Conference on Communications and Transit of the League of Nations approved of the "International Regime of Railways," thoroughgoing agreement for facilitating international traffic. This "Regime," moreover, supplements all agreements at present existing.

Under this Regime the parties agree among other things:

To set up through international service wherever lines of two different states meet if there is sufficient traffic to warrant this

To endeavor to have joint stations at frontier points, instead of

separate stations for each country.

Not to discriminate in equipment provided or otherwise against international traffic or against freight or passengers because of

nationality.

To restore service on any international route as soon as possible if for any reason it is suspended and while the route is closed to endeavor to route the business over any other line that may be open. To handle customs examinations and passport formalities with as

little delay to traffic as possible.

To set up standards which will facilitate the free exchange of rolling stock.

To make immune from seizure rolling stock in the territory of a foreign country.

To set up through rates and a uniform contract for the consign-

ment of freight regardless of the international boundaries it has to

To make regulations providing for prompt payment to all the railways participating in the conveyance of a unit of traffic by the railway which collected the charges for the service.

To make regulations regarding the distribution of charges arising

out of claims against the railways.

To exert every effort to minimize the difficulties arising from fluctuations in exchange.

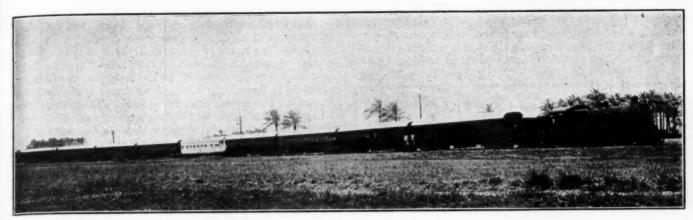
Thus are Europe and European railways, however slowly, surely recovering from the effects of the war.

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Passenger Train in Nile Valley-Photo by A. Reid, Cairo

# Egypt Jogging Along in the Railway Race

Fairly Prosperous But Inactive—Control Passing from British to Egyptian Hands

By Cloyce K. Huston

A glance at its railway map will show one instantly that Egypt presents railway enterprise with some problems which are entirely unique in character. This is due chiefly to the geography of the country. Although Egyptian authority extends over a vast territory, only about 12,400 square miles are rendered habitable by the Nile river, and this comparatively small territory (about equal to that of Maryland

In the Yards at Cairo

or one twenty-second of that of the state of Texas) supports almost 14,000,000 people. The settled portion, therefore, has a total length (from Alexandria to Assuan) of 678 miles, and an average width of 18½ miles. A long narrow strip from Assuan to Cairo, there developing into a fan-like triangle reaching toward the Mediterranean, Egypt proper is plainly dependent upon the Nile. Where the Nile does not go, there is no life.

#### No Branch Line Problem

It is obvious, therefore, that the line of all communication is definitely marked out and the nature of the railways is all but foreordained; there are no mountain ranges to be crossed or tunneled through; there is not a complex network of lines to be co-ordinated, but rather a long stretch from a southernmost to a northernmost point; there is a dense population to be served; and, finally, there is a heavy agricultural produce to be carried from a small cultivated area. In addition to this, other significant features might be mentioned, such as the extreme age of the country, the usual slow-moving gait common to all oriental countries, the misinterpretation of and inefficiency in all things modern, the absence of anything like an adequate supply of natural industrial resources and the unsettled state-naturally resulting from the unwilling subjection of a unified people to a foreign power. This has been, and is, the Egyptian railway problem.

## History

The first railway in Egypt was opened for service in 1856, being a direct line between Alexandria and Cairo, thus connecting the capital city of the country with the Mediterranean. The next step was to complete the overland route to the Red sea. This was done by constructing a line from Cairo to Suez, which was later replaced by a line from Ismailia to Suez, while the latter was in its turn superseded by the water route upon the opening to traffic of the Suez canal in 1869. During those years the overland traffic between Alexandria and Suez was no inconsiderable item, creating a revenue of \$3,750,000,000 annually. At about the same time, construction began on the road south of Cairo to Minia, and by 1891 the system had been extended to Assuan, the present southern terminus.

Because of her special interest in a direct route to eastern waters, and, later, her occupation of Egypt, Great Britain has been the dominating influence in the greater share of Egyptian railway construction. Some of this interest, no doubt, can be attributed to her huge traffic in the cotton produce of Egypt. An Englishman built the first line, and Englishmen have since furnished much of the material that has gone into subsequent lines. In 1876 the Egyptian State Railways by a decree of the Khedive were placed under the administration of a mixed board, composed of one Englishman, one Frenchman and one Egyptian. This international board ceased to exist in 1905, however, and since that time administrative power has been headed by a general manager.

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Egyptian railways have acquired an added significance through the opening of a line through to Palestine from Kantara, a feat which was accomplished largely as a military move during the late war. They will also figure as a vital part of the "Cape to Cairo" line, when that ambitious proj-

Port Said Beni Sue!

The Railways of Egypt

ect materializes, and thus increase immeasurably in im-

The railway system of Egypt is comprised of two distinct parts, the Egyptian State Railways and the private railways. The former are owned and operated by the government and provide through service between chief points. The latter are light auxiliary railways, privately-owned and operating under a concession from the government covering a period of from 50 to 70 years. The three chief light railway systems, in order of importance, are as follows: the Egyptian Delta Light Railways Company, la Société Anonyme des Chemins de Fer de la Basse Egypte and the Fayoum Light Railways Company. The private lines are subsidiary to the main lines of the State Railways, and serve to tap the out-of-the-way points of the agricultural region, chiefly in the delta. The relative mileage and importance of the various lines may be seen from the following table:

Egyptian Egyptian Chemins	State Railways State Railways Delta Light Railways Company de Fer de Basse Egypte. Light Railways Company.	Gage 4' 8¼" 3' 6" 2' 6" 39.36" 2' 6"	Miles 1,743 277 559.5 139 96.5
	Total mileage		2 915

From these figures it is clear that the State Railways have almost three-fourths of the total route mileage, and, since they are standard gage and connect the chief commercial and agricultural centers, the burden of the traffic falls to them. Indeed, a consideration of the State Railways may safely be said to give an accurate index to the entire Egyptian system. It might be observed in passing that the only stretch of narrow gage track worthy of mention under the state system



A Typical Suburban Station

is that between Assuan and Luxor. Standardization of this line was considered prior to the war, but the plan has been abandoned for the present. All of the lines under private control are narrow gage, either 2-ft.-6-in. or meter gage, and will probable remain so indefinitely. The longest through run in Egypt is from Cairo to Luxor, or a distance of about 424 miles, and the total number of stations open to traffic is 696.

# Nature of Traffic

Cotton growing is the greatest source of traffic goods in Egypt. During the fiscal year 1921-1922 cotton and cotton seed made up 17 per cent of the total tonnage on state railways; cereals followed with 12 per cent; coal 7 per cent; and other merchandise 64 per cent. The total tonnage for the year was 4,055,000. During the year 1922-1923 cotton transported, ginned and unginned, amounted to 276,794 tons and 130,018 respectively, while sugar and molasses totalled 127,112. The total tonnage of public goods carried for this year was 4,349,493.

During the same year (1922-1923) the total number of passengers carried on the state railways was 26,514,799, and it is worthy of notice that of these 880,377 were first class, 2,936,548 second class, and 22,697,674 third class. The total earnings for the year were \$38,813,460, consisting of \$16,115,135 from passenger traffic, \$20,460,690 from freight traffic and the remaining \$3,337,635 from miscellaneous

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have since and hem. y be tem. of stem sources, such as rents, profits on sales, and such. This means that freight earnings comprised 55.24 per cent of the total. Much special importance is attached to the tourist traffic here during the winter season, and careful arrangements are made to handle the passenger service up to Luxor in the most efficient manner.

## Rolling Stock

At the beginning of the current year the rolling stock of the Egyptian State Railways consisted of 687 locomotives, 1,590



Photo by A. Reid, Cairo

### Train Shed, Cairo Station

passenger cars, 14,497 freight cars and 279 service and miscellaneous vehicles, such as cranes, wrecking equipment and the like.

The more important trains are composed of large double-truck corridor compartment cars, lighted by gas or electricity and fitted with lavatories and clearstory roofs. Special attention must be given to passenger coaches constructed for upcountry use because of the extreme heat. Dining cars are attached to the principal expresses and on the night trains sleeping cars are run under an arrangement with the International Sleeping Car Company. The third-class coaches are open from end to end and contain seats in rows down the sides, much after the fashion of the old American coaches. The standard brake for all equipment is the vacuum automatic.

The freight cars consist of 30-ton steel box and open top cars (for coal and similar traffic) as well as a considerable

miscellaneous types. Enginehouse and shops are furnished with traveling steam cranes and wrecking trains with the necessary appliances.

At Cairo an area of over 30 acres is devoted to repair shops. These shops comprise a foundry, passenger car shop, boiler shop, locomotive shop, engine stalls, paint shops, etc. The greater part of the repair work on freight cars is carried on at Alexandria. All repairs to narrow gage equipment are handled by the shops at Luxor. The private railways have adequate shop service on their own respective systems.

The maximum clearance dimensions are as follows:

Length	34'
Width	8. 3.
Height (Extreme maximum clearance is 11' 5")	**
Weight	30 tons

There are on the State Railways about 250 bridges, eight of which span the Nile, the remainder crossing broad nav-



Rear View of Central Station, Cairo

igable canals. A great number of these bridges are provided with swing spans in order to allow the passing of heavy boat traffic. In addition to the ordinary bridges there are a number of subways and over-crossings.

### Growth and Development

Growth and development of the railways in Egypt at the present time are almost negligible. A few additional miles of

				Egy	ptian Sta	te Railw	nys			Egyptian	Chemins de Fer de la Basse Egypt			
	To	tals	System	Proper	Auxilia	ry Line	Oas	is Line		lta Light ways, Ltd.			Fayoum t Light Railways	
Year-	1920-21	1921-22	1920-21	1921-22	1920-21	1921-22	1920-21	1921-22	1920-21	1921-22	1920-21	1921-22	1920-21	1921-22
Mileage	2,210 703	2,613 696	1,518 354	1,518 349	258 83	248 83	133	133	540 215	540 213	60 22	60 22	94 22	94 22
Rolling stock: Locomotives Coaches Freight cars Passengers carried (thousands). Freight carried (thousands tons) Animals carried (thousands).	776 1,485 17,184 41,050 4,477 741	803 1,526 17,234 35,278 4,623 652	615 1,007 13,568 30,548 3,769 720	643 1,036 13,632 27,342 4,055 626	39 85 1,599 1,059	40 91 1,613 799	4 8 32 5 4	4 8 32 5 3	86 264 1,388 7,190 515	83 264 1,358 5,402 412	15 74 349 1,032 83 16	16 80 351 883 66 21	17 47 248 1,216 106 5	17 47 248 841 87 5
Earnings (thousands): Passengers Freight and all other Totals Earnings per mile of line. Operating expenses (thousands). Profits (thousands)	\$19,160 24,745 43,905 8,551 42,385 1,525	\$16,255 26,345 42,600 8,055 35,160 7,440	\$16,930 23,315 40,265 5,300 39,455 790	\$14,550 24,950 36,500 5,190 32,200 6,800	\$195 310 505 391 575 —70	\$155 360 415 400 530 —15	\$10 15 25 40 45 —15	\$10 20 30 41 40 —10	\$1,575 845 2,420 895 1,805 625	\$1,175 760 1,935 715 1,450 485	\$225 140 365 1,200 275 90	\$210 135 345 1,125 280 65	\$225 120 345 725 230 115	\$155 120 275 581 160 115

number of four-wheel 10-ton open cars. The latter in most cases are fitted with high ends to carry lumbea, but are also adaptable for the cotton and onion traffic. There are, in addition, petroleum tanks, water tanks, ventilated cars, powder cars, cattle cars, ballast cars, insulated cars and other such

track may be added or a handful of new passenger cars placed on the rails year by year, but there is nothing that resembles real expansion or progress. It must be remembered, too, that Egypt was one of the few countries that did not suffer a severe economic upheaval as a result of the late war; rather it should be said that she was benefited by it. The stagnancy of railway enterprise at the present time, then, can be accounted for only by the limited area and resources of the country, and, perhaps, the natural backwardness of the nation. Any construction proposed for the near future must necessarily be of a very limited form and scarcely warrants the attention of any industrial interests other than of the power which already has such a strong foothold in the Egyptian railway system—i.e. Great Britain. Of course, new forms of motive power, such as internal combustion locomotives or electric locomotives, signal devices—the Westinghouse electro-pneumatic system has already been adopted at Cairo—and other improvements of a like nature may hope to find a market, but large scale construction work can scarcely be said to be flourishing at the present time.

# Personnel

The total number of employees now working under the State Railway System is slightly over 30,000. This number is comprised chiefly of native Egyptians, only the administrative posts and executive offices being filled by English. These positions are gradually being vacated, however, and natives are being recruited more and more for responsible positions. British control is passing out of Egypt—political control as well as control of the communications and every

his withdrawal are the general-deterioration and lack of properly supervised repair work, along with the refusal of the Ministry of Communications to allow the appointment of engineers to take the place of those who have recently resigned.

A commission has been sent to England by the department of education to study mechanical engineering, but it is feared that they will not have completed their studies in time to correct the present unfortunate state of disrepair.

#### Traffic Increase

For the sake of comparison it is interesting to note that the total annual revenue from the Egyptian State Railways increased from \$19,581,055 in 1912 to \$39,498,845 in 1922, or an increase of approximately 100 per cent over a period of 10 years. In the same period the gross expenditures increased from \$11,454,205 to \$32,702,115, or an increase of only slightly less than 200 per cent. The net earnings, therefore, show only negligible increase, from \$6,796,730 to \$8,126,850, or less than two per cent. During the two years the net receipts per train mile were identical, amounting to \$0.782 in each instance.

A comparison of the year 1920-1921 with 1921-1922 shows a decrease in the gross receipts, from \$40,245,310 to \$39,498,845, of just under two per cent. Operating expenses ex-



Central Station, Cairo, Egypt

other department. Many have already left for England or other colonies; a great number more will leave during next month (January, 1924); and all the rest will have vacated office by 1927. This means, undeniably, a change in the railways of Egypt; perhaps there will be no radical revolution, but the administrative policies and methods must inevitably be altered, even though mechanics and expert engineers are receiving European training at the present time. Only time can tell the direction in which they will move when sailing under their own canvas.

# Immunity From Serious Accidents

Although native labor may be blamed for the apparent slowness of much of the service, the extreme caution which has necessarily resulted from the employment of an Egyptian staff is an off-setting virtue, and it may be said of Egypt that she enjoys a remarkably high degree of immunity from serious railway accidents. Low speed also keeps down operating costs as well as the number of casualties.

At the moment of writing (November 29, 1923) word comes that the general manager of the State Railways, an Englishman, has tendered his resignation. Reasons given for

perienced a fall, from \$39,456,590 to \$32,702,115. Net earnings jumped from \$788,720 to \$6,796,730, indicating too close a margin between gross earnings and operating expenses in 1920-1921 which was corrected in the following year. In these two years respectively the total mileage of track was 1,569 and 1,572, showing an extension of the system to the enormous amount of three miles. Other figures for these two years may be given respectively as follows: number of stations, 354 and 349; passenger cars (first, second and third-class), 1,007 and 1,036; locomotives, 615 and 643; freight cars, 13,568 and 13,632; total number of locomotive miles, 18,739,000 and 19,806,000; merchandise transported, 3,769,000 and 4,055,000; animals transported, 720,000 and 626,000; number of passengers carried, 30,548,000 and 27,342,000; and passenger miles, 850,334,960 and 746,897,340 for the years 1920 and 1921 respectively.

A general survey of the entire system of Egyptian railways. including the private lines, is obtainable from the accompanying table. These statistics were prepared in French by the Department of Statistics and have been translated, the Egyptian pound being taken at five dollars and the kilometer at six-tenths of a mile.



Union Government Building, Pretoria, South Africa

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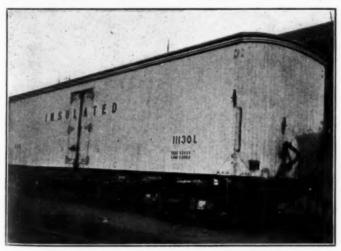
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# Brighter Prospects for South African Railways

Now Earning a Net After Years of Deficits—Keeping Ahead of Traffic Demands

By Gilbert E. Chittenden

THE YEAR 1923 has produced a favorable change in the financial position of the South African Railways and Harbors Administration after a prolonged struggle against high operating costs and reduced earnings. The sig-



A Refrigerator Car on the S. A. R.

nificance of the change can only be stated properly in the light of a brief retrospect which properly should date back to the war years when the period of financial adversity set in as the widespread effects of the upheaval in Europe became general.

# Huge Deficits Accumulated

In South Africa, as in many other countries, the financial troubles of the railways were intensified by the trade, labor and industrial problems which multiplied so freely and rapidly in the period after the war, and from 1916-1917 onwards the administration had to contend with an unbroken series of deficits varying from \$46,6222 in 1916-17 to \$7,-729,786 in 1921-22. The average loss per annum over that period was roughly \$3,900,000 and on March 31, 1922, less than two years ago, the accumulated deficit had reached \$20,360,358 with operating costs continuing upwards and the gold and coal mining industries in a state of partial paralysis as the result of a serious industrial and revolutionary upheaval on the Witwatersrand from January to March, 1922. At that juncture steps were taken to ease the growing financial burden by obtaining the consent of Parliament to the transfer of \$9,720,000 from the renewals fund toward the reduction of the deficit. This measure had the effect of reducing it to \$10,640,358, but there was a further loss of \$151,321 on operations for the year 1922-23, which brought the accumulated deficit up to \$10,791,679 at the commencement of the present financial year which will end on March 31, 1924.

#### Showing a Profit This Year

In the meantime a favorable change has set in during 1923 and this tendency, coupled with the steady application of economy in all operating expenses has brought the railways

<sup>&</sup>lt;sup>1</sup> The fiscal year of the South African Railways ends March 31.

<sup>2</sup> This and other figures of money are given in American currency at par of exchange.

to what is probably a turning point in the struggle against financial stringency. Up to the end of September, 1923,that is to say for the first six months of the current financial year-the operating results had shown progressive improvement, and at that date there was a surplus available of \$2,-677,214 which had reduced the accumulated deficit from \$10,791,679 to \$8,114,465. With the unsettled state of affairs in Europe reacting closely upon South African trade and industries, and in the face of a certain sluggishness in the internal trade of the country, those results are both gratifying and significant. Though it would be too much to predict that the railways are witnessing the last of their financial troubles, there are encouraging signs that they have encountered the worst of them and that they have also weathered the most trying and difficult times experienced since the war. The outlook for the future, therefore, is distinctly reassuring.

The latest detailed results which afford some guide to railway business in South Africa are those for the year 1922-23 as published recently in the annual report of the general manager of railways. The gross operating expenses for the last financial year were \$75,441,839. This figure showed a saving of \$8,219,548, or 10 per cent, compared with the



**Typical Country Station** 

The decrease was brought about mainly previous year. through a reduction of staff due to reorganization, reduced overtime and Sunday time payments, reduction in the quantities and cost of stores and materials and to savings effected in the maintenance of buildings, permanent way structures and other services.

### Improved Operating Ratio

Under the main heads of operating expenses there were actual savings of \$1,299,963, or 9 per cent, on maintenance of permanent way and works; \$1,448,625, or 8 per cent, on transportation expenses; \$1,621,942, or 8 per cent, on traffic expenses; and \$232,386 on cartage and general services. Under the heading of expenses for depreciation there was a decrease of \$4,010,807, or roughly 50 per cent. Expenses per train mile worked out at \$2.28 and per mile of line at \$6,867. These figures reflected reductions of 11 and 21 per cent respectively. The operating ratio was 77, a decrease of 7 per cent compared with the ratio for the previous year. The route mileage of lines owned on March 31, 1923, was 10,987, and the mileage actually operated, including certain privately owned lines, was 11,628. The train mileage totalled 33,026,-174. The total capital investment rose from \$502,305,654 on March 31, 1922, to \$528,081,097 on March 31, 1923, an increase of \$25,775,443, or 5 per cent.

Earnings and traffic in 1922-23 were fairly well main-

tained. A total of 61,582,447 passengers, 3,254,477 head of

livestock and 18,407,200 tons of goods and mineral traffic were conveyed over the railways. The total gross earnings amounted to \$97,913,433, of which passenger traffic produced \$25,278,226; goods and minerals other than coal \$47,171,-136; coal \$16,305,222, and livestock, parcels and other traffic \$9,158,850. Compared with the previous year the total earnings for 1922-23 showed a decrease of \$3,210,331.



Dispatcher's Office, Natal District, S. A. R.

or 3 per cent, and the net result of the operations for the year was a loss of \$151,321.

#### Reasons for Improved Results

Against these results, the first six months of the current financial year have, as previously stated, produced a surplus of about \$2,600,000. The improvement has been due principally to a splendid maize season entailing heavy shipments, to steadier demands for South African bunker and export coal and to increased traffic in other agricultural products and minerals as well as timber, machinery and building ma-



S. A. R. Police

While the financial position and traffic have improved, there has been no relaxation of the economy measures which continue to be the main spring actuating the executive control of the South African Railways today. Adherence to this course, however, has not stultified the larger policy of development which has been the chief incentive since the government railways were unified in 1910. Some of the largest schemes embarked upon under that policy are now approaching fulfilment, and at no time in the past history of the country has railway and harbor development work proceeded amou certai rough

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ceeded on a wider or more comprehensive scale. The total amounts involved in the various large projects in hand and certain work contemplated in the near future is estimated at roughly \$120,000,000.

#### Construction Program

The railway construction program embracing 22 lines of an aggregate length of 851 miles, at a cost of \$19,865,833, has been vigorously pressed forward during the past year. Certain of these new lines have already been opened for traffic and the greater proportion of the remaining mileage, principally in the form of agricultural and mineral lines for developing and tapping productive areas, will come into operation during the year 1924.

#### Progress on Electrification

On the Natal main line, the extensive scheme of electrification between Glencoe Junction and Maritzburg, entailing the conversion of about 270 miles of track from steam to electric operation, has made great headway and it is anticipated that the central power plant at Colenso will commence generating electricity in May, 1924. Extensions of the



Zulu Workmen and Decorated Locomotive of Governor-General's Train

electrified system to other busy sections of line in South Africa are under consideration at the present time.

#### Grain Elevators and Harbor Work

The grain elevator system which is to be operated and controlled by the railway administration is nearing completion and will be in readiness for handling the greater portion of the 1924 grain crop. Orders have been placed for a large number of special bulk grain cars to deal with this traffic.

At the principal ports, namely, Walvis Bay, Cape Town, Port Elizabeth, East London and Durban, various schemes of comprehensive harbor development and improvement are either proceeding or are to be undertaken in the near future. The most notable work in this respect is that nearing completion at the port of Durban. The whole question of harbor development has recently been the subject of investigation and report by an independent authority from Europe, and, partly as a result of that report, the government has signified its intention of proceeding with certain large schemes of expansion, though any detailed reference to the work projected would be premature at the present stage.

#### Keeping Railways Ahead of Demand

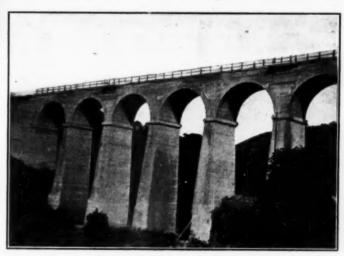
Perhaps the most striking feature of the policy of expansion is the consistent effort which has been and is being made to keep railway and harbor developments abreast of one another and also ahead of demands. In times of depression there have been difficulties in the way, particularly in a partially developed country like South Africa where the natural tendency among the scattered communities is to regard local needs as the most urgent and necessary and to



Houses Built by the South African Railways for Their Employees, Orange Free State

lose sight of the larger national aims in any comprehensive scheme of expansion. These difficulties must remain for sometime to come pending more intensive exploitation and settlement, but a discerning critic cannot fail to observe the progress that has been made in the past few years, and the great promise which the increasing transportation and port facilities of the country, in conjunction with its remarkable resources and powers of production, give for the future.

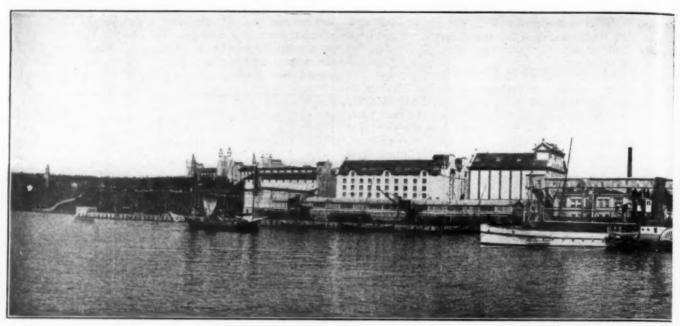
The whole trend of traffic at the present time serves to



Concrete Viaduct on the S. A. R.

show that the railways are playing a vital part as a developing agency. Less than 15 years ago high-rated import traffic from the ports to the interior was the outstanding characteristic of railway business. Today the greater proportion of service is confined to the conveyance of low-rated traffic in local products from the inland areas in the ports, which has necessitated a revision of the whole tariff policy.

In broad review the railway position in South Africa at the end of 1923 was essentially sound and reassuring, and as a guide to the general business and industrial condition of the country it gave justifiable cause for an optimistic outlook on the future.



As Left, Railway Docks-At Right, Station, Haidir Pasha, Opposite Constantinople

# Future of Railways in Turkey Still in Doubt

# Most Lines Privately Operated With Government Guarantee—Failure of Chester Scheme

By A. Vahid Bey

LTHOUGH a peace treaty has recently been signed at Lausanne between Turkey and the allied European powers, the exact area of Anatolia, or Turkish Asia Minor, has not been definitely determined. The reason for this is that the Mosul question has not yet been settled between England and Turkey. The negotiations regarding these important oil fields have not even actually begun. Both Turkey and the Iraq government (with England as the mandatory power) are equally eager to secure the possession of the province of Mosul. Should the parties be unable to come to an agreement after negotiations, then the matter will be referred to the League of Nations, which, according to the Lausanne treaty, will be entitled to give a This decision will be final and will settle the dispute. The vital importance of the Mosul oil fields to Turkey, and especially for the future development of the railways in Asia Minor, is evident.

Though the exact area of Anatolia, or Turkish Asia Minor, cannot be at present determined exactly, in consequence of the above conflict about Mosul, it can, however, be taken as something between 180,000 and 200,000 square miles (about the same area as that of Ohio, Indiana, Illinois and Missouri combined). The population of Turkey has been reduced to about eight or nine million as a result of the continual wars and disturbances in its European and Asiatic parts during the lost 15 years.

parts during the last 15 years.

Although the former Ottoman empire has suffered such enormous loss in territory and population, this means in reality a blessing for the Turkish nation. Today, Turkey is no longer the old empire governed by a sultan, but is a young and robust republic, thanks to the energetic will and patriotic sacrifices of the nation under the leadership of Gazi Moustafa Kemal Pasha. This republic is built on the same modern principles as adopted by many civilized nations in

the world. The domain of the republic is now a compact national land of Turks, and its population is, in a large scale, homogenous. lin

#### Physical Characteristics

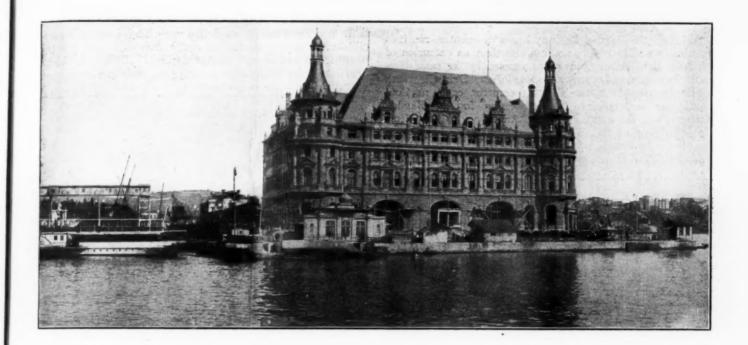
Physically Asia Minor is a plateau sloping from the great Taurus mountains in the South to the mountains bordering on the Black sea in the North, and westwards towards the shores of the Aegean sea. Numerous passes through the Taurus and Anti-Taurus allow communication with the Eastern portions of the old empire. The general elevation of the plateau is from 2,000 to 3,000 ft. The climate of Anatolia is not alike in all parts of the country. In general, Asia Minor is colder in winter and warmer in summer than other countries of the same geographical latitude in Europe.

### Companies Operating Under Government Guarantees

The railways of Turkey-in-Europe and Turkey-in-Asia are almost entirely owned by private companies. The owners are generally foreigners, German, French and British interests predominating. Nearly all of these railways are constructed and operated on the basis of a yearly guarantee from the government of so much a kilometer (.62 miles). Consequently the Turkish government, each year, pays to these companies a certain sum as compensation, in order to cover the interest of the foreign capital invested. The kilometric guarantee funds paid by the government are different for each railway line. The principal railways operating in Turkey at present are the following:

#### Anatolian Railway

At present the most important railway line in Asia Minor is the Anatolian Railway. The Ottoman government, in



Length

August, 1871, entrusted a French company with the construction, on the account of the government, of a railway line between Haidar-Pasha and Ismid. The construction of this line was completed in 1873. In 1880 a British company leased this line for 20 years. In 1888, the Germans took over the line and extended it.

The lines—all standard gage—belonging properly to this company are as follows:

Section	in miles
Haidar Pasha-Ismid	
Ismid-Eski Shehir	
Eski Shehir-Angora	
Eski Shehir-Kutahia	
Kutahia-Afion K. Hissar	
Afron K. Hissar-Konia	. 175
Total	634

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These lines are all single track, except a small suburban portion in Constantinople which was double tracked in 1911. An important portion of these lines suffered considerable damage during the recent Greek invasion. Consequently they are in need of reconstruction, although the Turkish government repaired many bridges, and did other necessary work after the defeat of the Greeks. The head office of the company is in Constantinople, and the general man-

ager is Edward Hugenin, a Swiss. This railway is just at this moment the burning question of the day. It constitutes the object of a spirited contest of international finance. Anglo-German, British and Anglo-Swiss capitalists are at present striving for the possession of these lines. This contest has arisen from provisions of the Lausanne peace treaty recently concluded between Turkey and the allied European powers. According to this treaty, the Turkish government has the right either to purchase this railway from the former operating company or to conclude a new contract with it readapting the former concession to the present political conditions. Now, the first of the rival groups, represented by Mr. Hugenin, is trying to convince the Turks that they should renew the former contract, while the two other groups advise the Turkish government to purchase the railway and to cancel the former contract. Should the purchase of the line be decided, the sum to be paid to the company by the government would be reckoned on the basis of the kilometric guarantees, the earnings of the last five years, including the normal pre-war years, and the capital invested.

The Turkish Commissioner for Public Works, who is known as one of the ablest Turkish experts in railway affairs, has already come to an agreement with Mr. Hugenin to the effect of renewing the former contract with certain modifications. This agreement has also been approved by the cabinet. The agreement must, however, be ratified by the National Assembly, which now has it under consideration. In the Assembly there are strong currents of opinion for and against this agreement. The finance committee of the Assembly opposes it and urges the purchase of the line by the government. According to the agreement as it now stands, both parties renounce reciprocally any claim for indemnity and the concessionaire agrees that the lines shall be properly repaired, rolling stock put into good shape, that lines projected shall be constructed,\* that Turks alone shall be employed, that working conditions shall be improved and the board of administration of the company shall include three Turkish members, etc.

The second rival group, which seem to be a purely British one, is very much interested in this railway, and is represented in Turkey by a group which has assumed the national Turkish name of the Touran Development Company; this company strongly urges the government not to renew the former contract but to purchase the line. It announces that it is prepared "to arrange a loan for the Turkish government, at the lowest possible rate of interest, which will enable the Turkish government immediately to purchase and thus to nationalize the railway. If the Turkish government is not disposed to buy the line for its own account, the group is also prepared to form a Turkish company and run the line, either for the government or as a private Turkish company, with head office and main administration in Turkey.' The group further undertakes to construct the projected additions to the line and highly praises the present govern-mental administration and the Turkish personnel. It is said to be made up of a syndicate of strong British industrial and financial concerns.

There is also a third group, apparently Anglo-Swiss, which seems to be equally eager to obtain the line and whose offer is, in its broad lines, identical with the offer of the second group.

<sup>\*</sup>According to reports published on November 25, 1923, a portion of the contemplated Angora-Yozgad-Sivas line, up to the 124th kilometer (about 77 miles) from Angora, has been constructed by the Turkish government as a temporary narrow-gage line.

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### The Bagdad Railway

Although the Bagdad Railway has a different name, it is practically and in reality nothing else than an extension of the Anatolian Railway. It was promoted by the same German capitalists under the patronage of the Deutsche Bank in Berlin. In 1898 the German emperor came to Constantinople and obtained the concession for the Bagdad Railway, i.e., the extension of the Anatolian Railway from Konia to Bagdad and Basra. The Bagdad Railway Company was formed in 1903, enjoying all privileges of the Anatolian Railway, notwithstanding the protests of Great



Eskishehir Station

Britain, France and Russia, whose interests were evidently affected by this new concession. The length of the Bagdad line was estimated to be about 1,240 miles, divided into 10 parts of 120 miles each, beginning from Konia, with branch lines totaling about 500 miles.

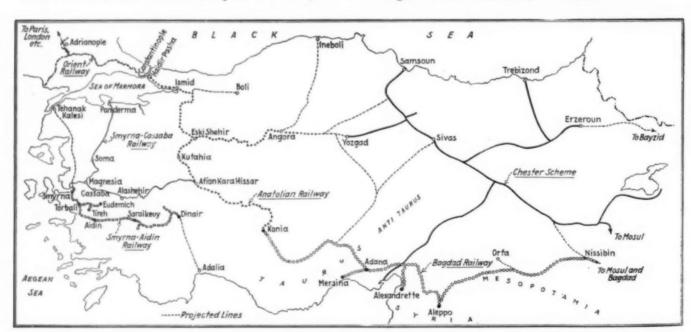
After the construction of the first part, 120 miles, to a

and upkeep. The Mersina-Adana branch line, however, was built to connect the Bagdad line with the sea and thus facilitate the supply of the necessary materials both for the construction and maintenance of the line. Political conditions interfered with continuous construction and, furthermore, a



Along the Sakaria River, Anatolia

comparatively small portion of it lies today within the Turkish territory. More important portions of the line remain now in Syria, under French control, and in Mesopotamia, under British mandate. The initial capital of the Bagdad Railway Company was \$3,000,000, 50 per cent having been paid. In addition to this and up to the outbreak of the world war, the sum of \$50,000,000 is said to have been actually spent for the construction of this line. In 1909 the company had to invite the participation of world finance in this enterprise and in 1913 French bankers bought a considerable number of shares.



The Railways of Turkey

little distance beyond the town of Erecli, however, the company was confronted with great difficulties, as the immense ranges of the Taurus and Amanus had to be crossed. This would cause incalculable expense of both initial construction Before and during the war different parts of the line between Aleppo and Nissibin, totaling nearly 280 miles, were constructed. Consequently this line may be considered to be already completed between Konia and Nissibin with a

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short branch to Alexandretta. The famous Taurus range was pierced by the Germans towards the end of the war, with a view to assuring military communication between the mainland of Anatolia and Syria. This was a notable feat of engineering. The construction of a large part of the line, beginning from Bagdad and extending towards Mosul-Nissibin was also started by the Germans before the war, and was continued during and after the war by the British who had occupied Mesopotamia.

The Turkish government, in 1910, had to reserve £746,-790 (about \$3,734,040) as a guarantee fund for this line. This was an unsupportable burden for the state, and the government has decided not to grant in the future railway concessions necessitating any guaranties.

# The Smyrna-Cassaba Railway

The concession for the Smyrna-Cassaba Railway, which is considered today a French line from the point of view of the capital invested, was granted in 1863. The original capital was 800,000 Turkish pounds (about \$3,600,000 at that time), the government having guaranteed 5 per cent interest on the capital. The capital of this railway and its extensions is now 142,560,000 francs\* (about \$28,512,000). Other extensions were made from time to time and the line now has the following mileage, standard gage:

Section	Length in miles
Smyrna-Cassaba	58
Cassaba-Alashehir	. 47
Alashehir-A. K. Hissar	
Smyrna-Bournabat Magnesia-Soma	
Magnesia-Soma	. 00
Total	. 323.5

"In this article the "franc" is always French franc, which in the pre-war accounts is taken as 20 cents. The dollars are American dollars, and the tons are always short tons, 2,000 lb. One kilometer is taken as 0.62 mile. The mile is 5,280 feet.

The line has recently been extended from Soma to Panderma, bordering the Sea of Marmora. This extension is a little less than 100 miles long.

### The Smyrna-Aidin Railway

The concession for the Smyrna-Aidin Railway in which the British interests are mainly involved, was obtained in 1856 by a British group, the Smyrna-Aidin portion of the line having been constructed in 1866. In 1879 and 1899 further concessions were obtained for the construction of extensions. The original capital of this railway was 114,-693,673 francs (about \$22,939,735). It is believed that this railway is economically administered and is a lucrative business.

This railway is also of standard gage and is composed of the following sections:

Section	Length in miles
Smyrna-Aidin	
Aidin-Saraikeuy	
Saraikeuy-Dinair	
Torbali-Tireh Tchatal-Eudemish	
Five other branches	
Total	319.5

## The Orient Railway

The only line now existing in the territory of Turkey in Europe is the Orient Railway which extends from Constantinople to the Bulgarian boundary line, a little beyond This Turkish railway is now only about 170 Adrianople. miles long with a branch line of about 28 miles. It forms the first section of the route over which runs the Orient Express which connects Constantinople with Paris and London.

The Orient Railway had an original capital of 50,000,000 francs (about \$10,000,000) and a length of about 970 miles in Turkey-in-Europe, Bulgaria, Serbia and Greece. In consequence of many political changes in the Balkans, important portions of the original line passed in the hands of other states than Turkey, so that exact information about the earnings, etc., of the line is not available. On the other hand, this line is the only one which, during the world war, was relatively outside the actual field of battle.

The latest report of the company is for the years of 1917 and 1918 and is summarized below; this report covers only the 170 miles lying in Turkey:

Year	Total earnings, francs	Total ordinary expenses, francs	Extraordinary expenses, francs	Operating ratio
1917	19,103,706	11,034.598	484,344	57.6
	21,775,346	15.338.908	174,104	70.44

NOTE—In consequence of great fluctuations of the European currencies during these years, the above figures in francs cannot be reasonably converted to dollars. The franc is now worth about 5 cents U. S. currency, as against a par value of 19.3 cents.

In January, 1919, the allied powers occupied this rail-way and held it till the middle of 1923. Consequently, a reliable account cannot be given for this period. Until the outbreak of the world war Austrian capital dominated this

#### The Labor Problem

The total number of employees at present in the service of the Anatolian Railway is about 5,600, composed almost en-



A Station on the Bagdad Railway

tirely of Turks. As this railway is controlled at present by the government, practically no labor problem arises regarding it; but for the private companies the conditions differ. Not long ago the Smyrna-Aidin Railway was faced with labor troubles, but the differences were settled without a strike. But just at the moment of writing these lines (near end of November), the workmen of the Orient Railway in Constantinople, numbering about 1,500, have gone out on a strike. Consequently no train is running today on these lines.

In order that the Americans may know the nature of a typical strike in Turkey, the principal points and the claims of the strikers are stated below:

- -Dismissal of non-Turkish employees who betrayed the country.

  The reduction of wages made before should be cancelled.

  Wages should be increased 30 per cent.

- 4—Working day should be eight hours and the wages of track laborers should be what they were two years ago.

  5—One paid rest day should be granted a week.

  6—Double wages should be paid for holiday work.

  7—The time of service of station employees should be reduced
- from the prevalent 12 to 15 hours to a reasonable limit.

  A doctor should be permanently employed at shops and terminals for the railway personnel, with a properly equipped drug store.

9-In case of accident to an employee during service his wages

should continue to be paid.

In case of an employe being certified as ill by the company's doctor, such employee should receive half his salary during the whole period of his illness.

-In case of an employee being disabled during service, one

year's salary should be paid him.

12—In case of fatal accident, an indemnity corresponding to three years' wages should be paid his family, and his children should have priority for appointment to vacant posts in the company's service.

-A month's bonus should be given to the employees at the

end of each year. 14—Thirteen days' paid leave per year should be granted to the

-A certain employee, who was dismissed unjustly, should be

16—A delegation of employees should sit in judgment on the case of any employee accused of a fault, and liable to be dismissed, before his dismissal.

The company should pay 5,000 Turkish pounds (at present about \$2,600) to the savings bank to be created for the benefit of the workers.

The company has completely rejected points 3, 5, 13, 14, 16 and 17, accepting points 6, 8 and 9. Point 1 has been referred to the government which will investigate the matter. The company has partially accepted points 2, 4, 7, 11 and 12. With regard to point 10, the company was disposed to allow the payment of only 15 days' salary. Consequently the strike continues.

#### The Chester Concession and

### Other Construction Contemplated

The most important project for new railway construction in Asia Minor is the "Chester scheme," which has apparently fallen through. Other new railway construction is also contemplated but most of this is of comparatively minor importance.

The father of the "Chester scheme" was Admiral Chester, of the United States Navy, who had attempted before the war to obtain railway concessions in Asia Minor. Political events had prevented, however, the conclusion of a definite contract: but last year nearly the same project was revived again, and an American company, called the Ottoman-American Development Company, obtained the concession. This company was formed on May 5, 1922, in accordance with the laws of the state of Delaware and was represented in Turkey by Clayton Kennedy, a Canadian, and Arthur Chester, the son of Admiral Chester. These two men concluded on April 10, 1923, a definite agreement with the Turkish government.

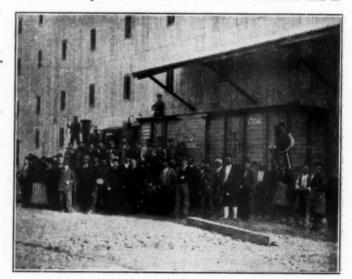
Much has appeared in the American press concerning this concession; therefore, only the more important points regarding this scheme will be given here.

The Ottoman-American Development Company, under the terms of the contract, was to construct railways totaling about 2,900 miles, of which 660 miles were not definitely binding on the company, it having the right to construct this portion of the line or not as it saw fit. The concession was to be of 99 years' duration and the lines were to be constructed and operated without any financial guarantee on the part of the Turkish government. The lines were to be of standard gage. The total cost of the whole project was estimated to be about \$400,000,000, probably without a prospect of substantial net earnings for 20 years to come. On the other hand, rich treasures of minerals and oil are believed to be in the territory to be tapped and the company was to have the sole right to exploit them within 12.5 miles on both sides of the track.

The company was to have started on November 10, 1923, the actual construction of the first section of the line from Samsoun to Sivas, about 223 miles long. It is estimated that this part of the line would cost at least \$25,000,000. However, at this writing 13 days have passed and the company is apparently unable to find the needed money. It has sent to Samsoun three or four Turkish engineers, picked up at the last minute and in great haste, recruiting also in Samsoun about 100 diggers as railway workers without, however, any proper machinery and materials. And so, the company claims that the actual construction has already begun in conformity with the agreement. The Turkish government, however, does not take this view and from all appearances the concession is as good as forfeited by the com-

The Ottoman-American Development Company is, today, naturally the object of much irony and merriment at the hands of its non-American rivals. On the other hand, the Turks feel bitter indignation against the company which seems to have succeeded only in delaying the development of the country. Moreover, on the day just after the signature of the contract, the two men who signed the contract for the company started an open dispute with each other. Instead of a powerful American Company, today only one person. Clayton Kennedy, seems to have remained on the scene. He is stated to have gone to Paris and London to find money, apparently without success. Nevertheless he continues to assert that the necessary capital is already at hand.

This apparent debacle is naturally working to the detriment of American business interests in the Orient. In fact, the Turks had expected much from the future economic and in-



Grain Elevator and Typical Group of Workmen, Derindie, Near Ismid, Anatolia

dustrial activities of American business men in Asia Minor. First of all, the Turks considered that the American business men could supply the needed capital for the development of Turkey and that the United States had no political aims and ambitions regarding Turkish territories. quently the Turks very willingly gave to an American company the concession of such an important railway, notwithstanding the fact that many other international competitors were eagerly striving to obtain the same concession. The Turks were also sincerely disposed to prefer the Americans in almost all other commercial, economic and industrial enterprises in Turkey. The first important business transaction with an American company has apparently turned to a bitter disappointment for the Turks.

Today there are in Turkey immense economic, industrial and commercial prospects of work for American capital and skill, in all lines of business. Notwithstanding the first unfortunate experience already made, the Turks are still inclined to believe that American capital and skill can do much for the free development of their country. They will receive with the same sympathy as before those Americans who prove themselves earnest business men and who represent business houses which enjoy undoubted credit and reputation.

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What the Bandits Did to China's Finest Train

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# China's Lines Do Well Under Trying Conditions

Slight Decrease in Net Earnings Despite Political Disturbance in 1922—Improvement in 1923

By Railway Age's Correspondent in China

In Order to obtain a fair view of the situation of the Chinese railways in 1923 one must hold as a background the situation in 1922. The official returns for the year 1922 have but recently been compiled, although an

Tso-lin. While the funds from that section do not reach the coffers of the government, the line is working nevertheless.

The increase in operating revenue, as reported, is due to the inclusion of the figures for the Lung Hai—a line technically under construction, which according to the Loan Agreement, as well as the official accounting rules, makes its net revenues a credit to the construction costs. Had it



Paotou Station, Peking-Suiyuan Line

estimate was given out officially several months ago. The final official results are given in the table.

To those who have followed the accounts of the disorders in China, the moderate proportions of this decrease in surplus for the year 1922 must come as something of a surprise. It amounts to little more than the earnings of the portion of the Peking-Mukden line which was seized by Chang

FINANCIAL STATEM	Amount		Increase over 1921
Operating revenues Operating expenses Net operating revenues. Income debits (interest taxes, etc.). Income credits (rentals, etc.) Net income debits. Surplus for the year.	56,659,483.79 42,896,745.43 18,560,445.51 1,680,402.17 16,880,043.34	Dec.	\$3,105,393.08 2,692,438.30 412,954.78 2,292,316.24 805,002.41 3,097,318.65 2,684,363.87
Less: Net operating revenue of the Lung Hai railway  True surplus for the year	1,779,440.35 \$24,23 <b>7,2</b> 61.74	Dec.	1,779,440.35 \$4,463,804.22

not been for the inclusion of this line, the reported figures would have shown a slight loss compared with the year before. But the extent of the Lung Hai revenues is probably not so great as that of the confiscated portion of the Peking-Mukden line, referred to above. Hence it is clear that in spite of the practical cessation of traffic for a full month due to military operations in North China, earnings were about the same as the year before. This is equivalent to saying that the remaining months of the year showed an increase of about 8 per cent compared with a similar period of the previous year.

#### 1923 Should Show Big Revenue Increase

With no military movements of importance so far, the year 1923 should show a big increase in revenue over 1922.

Approximate returns of traffic for the first seven months of the year sustain this prediction, showing an increase of \$6,300,000—ten per cent—in spite of the fact that the comparison is for a period which includes for four months of last year the "outside Wall" earnings. Aside from the Peking-Mukden, which is affected as just described, the only important decrease on any line is that on the Canton-Kowloon, whose operations show a loss of over half a million due to interference by the forces of Sun Yat Sen. The increases on other lines are of substantial amounts and percentages, viz., 15 per cent on the Shanghai-Nanking, 17 per cent on the Tientsin-Pukow, 21 per cent on the Peking-

Hankow and, most gratifying of all, 41 per cent on the Peking-

Suiyuan. The demoralization of discipline on the Peking-Suiyuan line seems to have been checked. The present set of officers has been able to hold its place for nearly a year with the result that duties of employees have been defined somewhat and back work is being caught up. rails Paotou extension, whose reached the Yellow river early in the year, has tapped the great areas of Shensi and Kensu, which are drained by this river, and in addition make a bid for the caravan traffic from Sinkiang. Something in the nature of competition for this traffic will exist next year, when the rails of the Lung Hai reach the Yellow river at Shenchow. However, the Peking-Suiyuan has the advantage of having reached the river first and, what is more important, reaches it 400 miles higher up, not only saving the further river trip with its exposure to robbers but saving at least one transshipment around impassable rapids. Hitherto, much of this river traffic left the river and proceeded by camel and pack mule either to Kalgan or to Shuntefu, depending somewhat on the stage of the river and the quiet of the regions to be traversed.

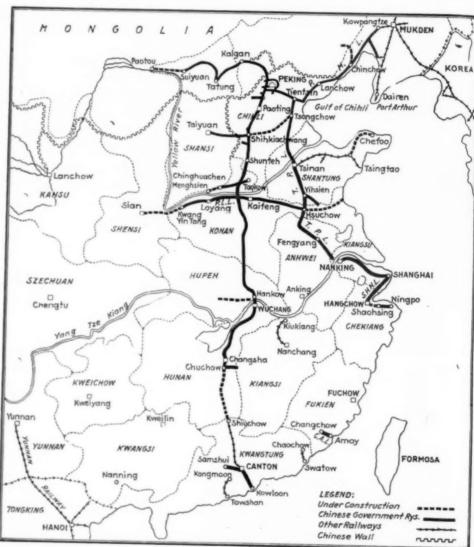
The extension from Suiyuan to Paotou consists of little more than ties and rails laid on the ground. The track is being gradually raised as revenues permit. How this extension has been possible under the present financial conditions is a

mystery to outsiders, and indicates that underneath there must be a definite policy upon which all Chinese factions are agreed and a determination which foreigners have not suspected.

Work on the Lung Hai, also, still continues. At the west end the tunnel has been completed and construction trains are runing through. It is expected that by the end of December trains will be able to reach Shenchow—on the Yellow river—where construction will halt for some time. On the east end, the Dutch contractors are pushing on toward Haichow.

Due to conditions such as unfavorable rates of exchange, war-time prices for materials and delays caused by difficulties of war-time finance, this line has become the most expensive of any in China. The per kilometre cost up to December 31,

1922, was approximately \$150,000 (Mex.), or not far from \$100,000 gold per mile. Its total cost at that date was about \$55,000,000 (Mex.) and its net revenues were only \$1,779,000—not half enough to meet interest charges. Revenues this year show a promise of being about eight per cent greater and, since the operating ratio is already less than 50, there is good reason to believe that when the line is in full operation, not more than four or five years will be required to put it in a position to pay all fixed charges. In addition, the Kaifeng-Honan line, which is situated midway and is operated in conjunction with the Lung Hai, shows the value of this connection by reporting an increase in revenues of 22



The Railways of China

per cent. The surplus of this line, amounting to over a million dollars, will be available for application on Lung Hai fixed charges.

#### Other Prosperous Lines

Another line which is showing unexpected strength is the Shanghai-Hangchow-Ningpo. The management of this line is consolidated with that of the Shanghai-Nanking, in a sense since it has the same set of officers. But in the case of the Shanghai-Nanking the British officers have the power of initiative and veto and merely report to the Chinese, while on the Shanghai-Hangchow-Ningpo, although the British officers have the power of initiative in some particulars, the Chinese have the right of veto and the full responsibility on many subjects. The results on the two lines for many years

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have served as a text for those who argued in favor of foreign control of Chinese railways. The revenues of the Shanghai-Hangchow-Ningpo did not come up to expectations and operating expenses were so high that little or nothing was left for fixed charges. Repayment of principal began before the line was able to pay interest and hence this road was a liability to the government system. However, last year the Shanghai-Hangchow-Ningpo was able to meet its interest payments with only nominal help from other sources, and this year it has been able to meet both interest and repayment of principal out of its own funds. Its revenues for



The "Blue Express' Leaving Peking-All American Equipment

the first seven months show an increase of 22 per cent over the same period last year.

Another line to show a splendid increase in revenue is the newly completed Ssu Tao line,—its increase to August 1 being 45 per cent.

Aside from these bright spots, the whole subject of China's railways bristles with questions, some legal, some political but most of them financial.

## A Problem of Finance

Among the legal questions is one which will be arbitrated shortly in London. It concerns the Shanghai-Nanking.

are a necessary part of every railway's yearly budget. The question of profits did not arise until four years ago, and since that time the officers of the line have been paying over to the financing corporation the money accruing to it as its share of the profits, but have been retaining the government's share for capital outlays and current cash requirements. In this way the government has been deprived of its share of the profits—at least for the time being—and that share has been so used as to increase the profits of the line, of which the corporation receives a share. The government has now

appealed this point to arbitration. Another question also has arisen regarding the use of the government's share of the profits. The Agreement states that the government's share of "the net profits will be re-The Agreement states tained . . . . for the purpose of accumulating a fund . . . . wherewith to pay off any loan bonds which may from time to time be redeemed under the terms of this agreement, or for generally reducing or ultimately discharging railway loan obligations whenever or wherever desirable." Pursuant to this clause the government proposed to pay the interest and installment of principal due on the Canton-Kowloon bonds December 1 out of its share of the Shanghai-Nanking profits. But the corporation refused to consent, urging that the words "railway loan obligations whenever or wherever desirable" refer exclusively to Shanghai-Nanking obligations. This question will be arbitrated at the same time. However, it throws a sidelight on the whole situation to know that all summer the corporation in question has been offering the government a loan sufficient to redeem the net profit certificates which are the subject of the contention, providing that the government would agree to contract a large additional loan for the construction of double track and branch lines to the Shanghai-Nanking. The corporation receives a commission of five per cent on all materials purchased abroad. The same corporation is urging another loan secured on Peking-Mukden revenues to be used in double tracking the line between Peking and

#### The Problem of the Chinese Eastern

The most dangerous political question connected with Chinese railways is that of the Chinese Eastern. The line, built by the Russian government in Chinese territory, from 1918 to 1922 was protected by the Inter-Allied Expedition-



Tientsin.

Footbridges at Platform at Tsinan on the Tientsin-Pukow

The Loan Agreement provided that the loan funds should be used for the construction and equipment of the railway, interest during construction being included under the costs of construction. It provided further that the profits of the line—above interest payments—should be distributed between the government and the financing corporation. It made no provision as to where working cash was to come from or who is to pay for the additions to property which

ary Forces so that the Bolsheviki never had the opportunity to drive out the members of the administration and appoint their own adherents in their places. After the departure of the Inter-Allied forces (Japanese especially), Chinese troops occupied the railway zone and maintained order. Now it appears that the "Reds" are about to demand control of the railway, and if the Chinese do not displace the present administration, the "Reds" will do it forcibly.

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However, in 1920 the Chinese government made an agreement with the Russo-Asiatic Bank, a Russian concern,with whom the construction agreement was made in the first instance in 1898—whereby the Chinese share with the bank the nomination of a board of directors. All actual control is kept out of the hands of the Chinese by the device of declaring the old statutes of the Chinese Eastern Railway as continuing in force and making all votes of the board require seven out of ten affirmative votes to carry. The bank is, of course, a private institution and now is under French control. So far as present-day Russia is concerned the bank is an outlaw. Having full control it is able to use the railway for its private purposes-and allegations are not lacking that it does so. However, at the Washington Con-"the powers other than China" voted to hold China responsible to the "foreign stockholders, bondholders and creditors" for the discharge of the trusteeship which she was deemed to have assumed by virtue of the position which she had taken on the railway.

China now finds herself likely to be held responsible to a "Red" Russia for the acts of a "White" administration over which she has no control. Her only way out of this dilemma would be either to recognize the present Soviet government and yield it control of the railway, or to herself repudiate the agreement with the bank made in 1920 and assume full administrative control. A "feeler" of this sort was evidently intended when during the summer the military authorities of Manchuria attempted to take over the control of the land department of the railway, alleging that in the operations of this department the Russians had violated the original agreement of 1898. (This would not be difficult to prove. It is virtually admitted by the Russian Count Witte in his Memoirs.) However, the powers unitedly opposed the Chinese action. The American minister visited Harbin and publicly condemned the action, after which the Chinese authorities receded from their position.



A School for Employees' Children on the Peking-Suiyuan

The secret of Chinese complaisance in this situation is not so much a conciousness of weakness as it is a desire to placate the powers that convened at Washington until they carry out the agreement which yields to her the right to increase her import tariffs to an effective 7½ per cent. China needs money. Hence during that period she cannot afford either to drive out the "White" administration of the railway nor to recognize the Soviet government. However, the attitude of the powers is dictated evidently by a desire to assist the French financiers who advanced Russia funds during her construction period. The French evidently look upon the Chinese Eastern as a pawn which can be used to recover some of their claims. However, if the cus-

toms conference should be put off so long that the Soviet forces lose patience and seize the railway, taking North Manchuria too, it is difficult to see what France or the powers would gain.

#### The Interests of International Finance

The foreign diplomats in China from time to time remind the Chinese Ministry of Communications that bills for railway materials are past due. However, when it is suggested that some constructive suggestion for the rehabilitation of railway finance be put forth, the impression is given out that dependence is being placed upon the expected increase in the customs revenue when the effective  $7\frac{1}{2}$  per cent is put



American Locomotive on the Peking-Suiyuan

in force. This, of course, depends upon the convening of the conference mentioned above; and the convening of that conference depends upon the ratification by France of the Washington Conference treaties. This in turn depends upon the ratification by China of an agreement made between the cabinet and the French minister with respect to paying the French portion of the Boxer indemnity in actual gold francs rather than in bills of exchange; and this has provoked a storm of opposition in China.

The powers support France in this contention and thus may help to prevent the conference which would provide the means to pay their bills. In the meantime it is pointed out that payment of the railway bills out of the customs increase merely pays those bills—foreign bills. It does not pay the Chinese creditors—who are numerous and influential. It does not restore the railways to a position where they can buy more materials. It threatens to mean that China ceases to be a market for railway materials. On the other hand it is pointed out that if the subject be taken in hand now, and the short terms loans which bear interest of 15 and 20 per cent are consolidated into eight per cent obligations payable in 10 years, some progress can be expected.

Of course some assurance must be offered the creditors that they will receive their eight per cent as well as their principal, otherwise 15 per cent on paper has some advantages over eight per cent which is also on paper only. The possibility of solving a political problem along with the financial one has occurred to some, and the solution suggested is that of a trusteeship into which the revenues of the lines are paid day by day as they are collected. This trusteeship could guarantee that the funds would not be used for general government purposes, which would be adequate for the creditors. The trusteeship, by preventing the faction in control of the government using these funds against its rivals, would at the same time remove much of the temptation on the part of said rivals to confiscate the revenues at the source. This would have a unifying effect in the regions served by railways.



A Limited Train, Japanese Government Railways

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# The Railways of Japan and South Manchuria

Situation as It Existed Prior to the Earthquake and Some Results of That Disaster

By Col. Edward A. Simmons

HAT FOLLOWS is the result of personal observations supplemented by information obtained on a trip to Japan prior to the earthquake, together with deductions from a summary of facts about the results of the recent disaster, which have since percolated through the network of chaos, and for which we are indebted in a large measure to N. Toda, Chief of the Section of Foreign Railway Affairs of the Department of Railways of Japan, and Michio Izawa, Traffic Manager of the Nagoya Section of the Japanese Government Railways.

## South Manchuria and Chosen (Korea)

In speaking of the railways of Japan one is liable to overlook the fact that the jurisdiction of the government extends over most of the railway mileage of both South Manchuria and Chosen (formerly Korea), including the main artery between Mukden, the terminus of the Peking-Mukden line of the Chinese Government Railways and Fusan, the Chosen port on the channel (Tsushima Strait) which connects the Yellow sea and Japan sea. Also, the government owns and operates the channel steamers between Fusan and Shimonoseki, the channel port on the main island of Japan proper. Hence a review of the railways of those countries is necessary for a complete understanding of the Japanese railway situation. Further, if read in connection with the article on "The Present Railway Situation in China" which appeared in the Railway Age of November 17, 1923, (page 911) the result will be a picture full of interesting contrasts.

The acquisition of the lines which now form the South Manchurian Railway Company dates back to the signing of the treaty of peace between Russia and Japan at Portsmouth, N. H., on September 5, 1905, through which Japan acquired the main line through Manchuria from Chang-chun to Dalny and Port Arthur and its branch lines, together with considerable other property and rights, including coal mines formerly owned by the Chinese Eastern Railway—all of which was turned over to the corporation on April 1, 1907. Through expansion in activities the South Manchuria Railway Company now operates some 683 miles of railways together with coal mines, steamships, an iron and steel



The Only Station Left Standing in Tokyo

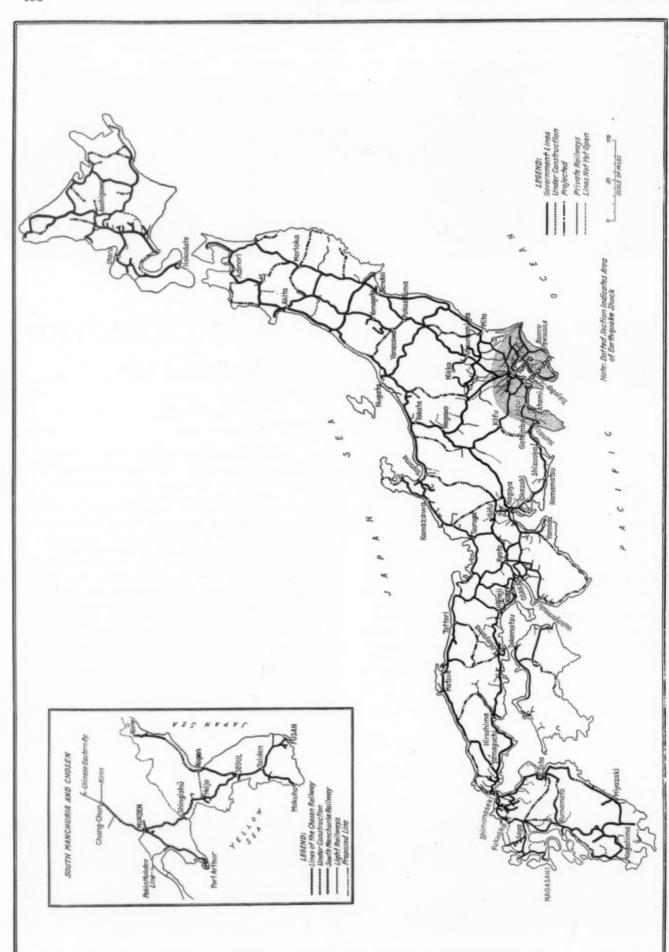
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The Railways of Japan, South Manchuria and Chosen

The Railways of Japan, South Manchuria and Chosen

works, gas and electrical plants, hotels, hospitals, experimental stations, analytical and testing laboratories, schools and factories, while whole towns have been planned and built and are now managed by the corporation. All officials and employees are housed, the accommodations being graded according to their respective ranks, the total number of buildings being in excess of 5,500.

The railway lines owned and operated by the South Man-

churia Railway Company are as follows:

Dairen to Chang-chun		
Riojun (Port Arthur) to Chou-shui-tzu		
Ta-shih-chiao to Ying-kou	13.9	
Yen-tai to coal mine	9.7	miles
Su-chia-tun to Fu-shun	30.9	miles
Su-chia-tun to Antung	161.7	miles
Total	609 6	- ilee

Also, the company co-operates in the management of the Chinese government lines between Chang-chun and Kirin

and Ssu-ping-kai and Cheng-chia-tun.

At the time the Japanese government acquired the Manchurian railways the gage was 3 ft. 6 in., except between Mukden and Antung, which was 2 ft. 6 in. only. Subsequently all were changed to standard gage.

The centre of activities of the South Manchuria Railway is at Dairen. The main shops, at Shahokou, a suburb of Dairen, are equipped to both build and repair locomotives and cars. There is also a repair shop at Liao-yang.

One-half of the \$220,000,000 of authorized capital stock of the South Manchuria Railway Company is owned by the Japanese government, \$50,000,000 of which was paid for in property. Dividends at the rate of six per cent a year are guaranteed on all stock held by the public. An additional two per cent per annum may be paid after dividends to that amount are paid to the government on its holdings; and should the dividends paid to the government equal three-and-one-half per cent, an additional supplementary dividend of not more than two per cent may be disbursed on the balance of the stock issued and outstanding.

During the fiscal year ended March 31, 1922, the net earnings of the South Manchuria Railway Company were \$15,693,069.40 which, added to a profit and loss balance of \$3,593,800.82 carried over from the previous year, made \$19,286,870.22 available for distribution. The following

table shows the disposition of the funds:

Reserve by law	\$ 784,653.47
Special reserve	2,500,000.00
Debentures redemption funds	3,500,000,00
Dividend on government stocks	
Dividend to public (6% per annum)	
Supplementary dividend to public (4% per annum)	1,840,000.00
Bonuses and special expenses to officials	250,000,00
Retirement allowances	132,500.00
Balance carried forward to the next term	2,850,862.75

The company is authorized to issue 25-year debentures not exceeding twice the paid-up capital nor in excess of the total authorized capital stock.

The government railways of Chosen, some 1,155 miles in all, are operated by the South Manchuria Railway. The main line extends along the western coast from Antung, on the Manchurian border southeast to Fusan, a distance of some 500 miles, all standard gage. By comparing the map of Chosen with that of China (See Railway Age, November 17, 1923, page 911) it will be seen that both are much alike in that the eastern coast is void of railways for a considerable distance, the coast towns in both instances being dependent on water transportation, while the same is true of southern Manchuria. Also, to the average tourist there is a great deal in common between the government railways of China and those of Manchuria-which is quite natural inasmuch as the general atmospheres of both countries are much alike. Further, this is augmented by the fact that Chinese employees outnumber Japanese on the South Manchuria-the reasons being that the former cost less and are

more easily obtainable and they are preferable to the Japanese because of the necessity for dealing with people who speak the Chinese language and follow Chinese customs and traditions. But as one travels on the through trains from Mukden to Fusan there is a marked change after crossing the border into Chosen. Koreans and Japanese supplant the Chinaman; and an air of prosperity supplants ease of movement closely resembling apathy.

In southern Manchuria no new railway construction is in prospect for the immediate future; while in Chosen the program calls for the completion by 1927 of the line now benig built from Shootsu southwest to Kanko, a distance of 374 miles—some 80 miles of which have been finished—and the building of a new line from Heijo, the second largest city

in Chosen, east to Kogen, 133 miles distant.

The shops of the government line in Chosen are at Keijo and Fusan, the former employing 1,600 and the latter 350



What the Earthquake Did to a Bridge Pier

workmen, about 80 per cent of whom are Koreans, the balance being largely Japanese. Most of the machinery is American built and in the main out of date—as is true of railway shops generally in China and Japan. Cars for freight service are built at Keijo in addition to the repairing of both freight and passenger cars and locomotives. A considerable percentage of the motive power and rolling stock on the Chosen railways, as in southern Manchuria, was built in America.

There are two express trains daily each way between Mukden and Fusan, both of which connect with through service to and from Tokio via the channel steamer service between Fusan and Shimonoseki; and one of the two is a "limited express" (extra fare train) which connects with express trains of the Chinese Government Railway between Mukden and Peking. The running time of the "limited express" between Mukden and Fusan, 762.2 miles, is 32½ hours; while the "express" consumes 35¾ hours.

Service on through trains between Mukden and Fusan is better than on the Chinese railways. The running time is faster, on the average; the cars are cleaner and the food and dining and sleeping car service are better. One of the marked contrasts lies in the fact that one does not have to get out of bed early at a junction point that the soiled bed "linen" may be removed and exchanged for "clean"—as is necessary on the "limited express" between Peking and Mukden. Then, too, one finds in the wash rooms of the sleeping cars on the trains from Mukden south, as in Japan proper, this sign: "Please be quick as others may be waiting."

Incidentally, something of the sort, backed by a strong arm, is needed in the wash rooms of our own Pullman cars.

#### Japan Proper

Japan proper, the area of which is some 7,000 square miles less than that of the State of California and whose population is approximately 60,000,000, as against 4,000,000 for California, has about 8,450 miles of railways, of which some 6,300 miles are owned and operated by the Japanese government. Further, plans for the future include about 6,000 miles of additional lines, some of which have been authorized. Of those 6,000 miles, about 15 per cent are private projects. Six months ago the prospects for slow



The Remains of a Railway Bridge

but steady accomplishment were good; but the effect of the earthquake of September 1 last on the whole economic structure of the empire is so far-reaching that it is doubtful if any material progress in added railway mileage will be made in the immediate future.

Prior to the earthquake Japan was still suffering from the general business depression which followed in the wake of the war; but insofar as her railways were concerned she seemed to be pulling steadily ahead. Now, however, she must pause and spend millions to mend damaged lines and rebuild others which were totally destroyed.

It appears that the seat of the earthquake, which began just before noon on September 1, was the bottom of the Pacific Ocean some 50 miles southeast of Tokio, the shocks radiating east and west involving the areas indicated on the map. Yokohama was all but absolutely destroyed, while between Kozu and Odawara on the Atami line, which was under construction, the roadbed disappeared completely. At Tokio, 18 miles north of Yokohama and the headquarters of the Japanese Government Railways, the damage was very great but due almost entirely to fire which swept over the city after the first shock. Here the loss included not only the offices of the railway administration, and the residences of some 200 employees, together with their clothing and house-

hold effects, but also the railway hospital, the departmental institute for training railway employees, the Kinschico car repair shops and two of the three main railway stations, the Tokio station alone remaining undamaged. Willing hands succeeded in transferring a lot of personal property from a number of the employees' homes to some empty cars to which a locomotive had been coupled; but the train failed to get out of reach of the flames because of damage to the track by the quake.

Naturally the electrified line between Tokio and Yokohama suffered severely; and the shops at Omiya, 16 miles from Tokio, were partly destroyed.

The damage from the earthquake in the affected area varied from land slides and collapsed bridges and tunnels to the complete disappearance of every vestige of railway property, as in the case already cited. At Nebukawa, four miles beyond Odawara on the Atami line, a landslide carried with it into the sea not only the station and track but also a passenger train which had stopped there.

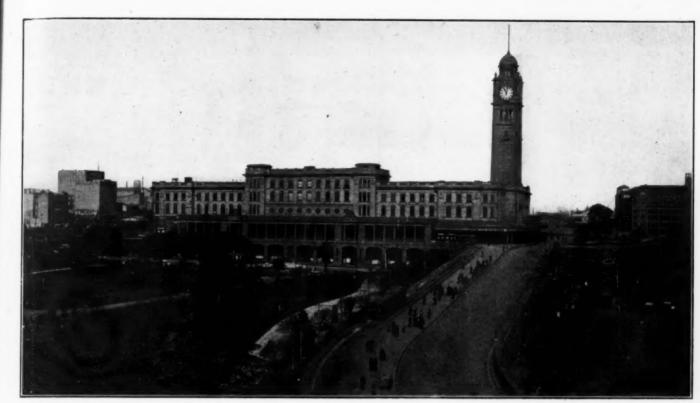
Six passengers and 16 freight trains en route through the stricken zone were either wrecked or partially burned, causing the death of 130 persons and injuries to 92 others. In addition, 73 railway employees were killed and 22 injured; while 10,018 suffered property losses through total or partial destruction of the houses in which they lived. Also 33 locomotives, 486 passenger cars, 1,249 freight cars and 31 electric cars were damaged, some beyond repair. The loss to the government railways is estimated at \$37,500,000.

Prior to the earthquake the principal topics of discussion were electrification and change of gage from 3 ft. 6 in. to standard. The existing electrified lines are those between Yokohama and Tokio and in the vicinity of those cities; and work was under way between Tokio and Yokosuka and Odawara, some 44 miles additional, part of which was wiped out by the earthquake. Ultimately the line between Tokio and Kobe, 373.5 miles, is to be electrified; but when this will be done is now indefinite.

As to change of gage, there is a considerable division of opinion both within the government and between railway officials. However, as matters now stand the only reason for changing would be the prospect of another war in which Japan might be jeopardized. The cost would run into many millions of dollars and would not be justified by the possible traffic, especially as about 55 per cent of the revenue is from passengers, most of whom travel third-class.

There is no marked difference to the casual eye of the traveler between the trains of Japan proper and those of Chosen. To the expert eye it is very clear that, judged by American ways and methods, there is much room for improvement in many directions; but the native traveler is quite satisfied, while higher standards would mean an economic upset with far-reaching results. The same would be true were western methods introduced into the offices and shops of the Japanese railways, which are susceptible of operation with from 25 to 50 per cent of the present number of employees; but under normal conditions the unemployment question is sufficiently acute to preclude the introduction of methods that would add to the seriousness of an already great and increasing problem. To that is due the inability of Japan to profit as she should from what those whom she sends abroad learn about the railways of other countries. In fact, those men, returning to their native country after an absence of one or more years are often openly referred to by employees as "Western devils" and every new move is eyed with suspicion. Withal, however, Japan is a well worth-while country; and irrespective of what the real relations between her and these United States may have been prior to the recent earthquake, America's prompt and generous aid to Japan in her hour of sorrow has resulted in an understanding that should mean much to both nations.

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Central Station, Sydney, N. S. W.

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# Conditions Generally Improved In Australia

Gage Problem Still Unsolved—Construction Progresses— Electrification a Success

By W. H. Newman

THE YEAR 1923 will be memorable in railway history in Australia as one of generally improving conditions after the depression following the post-war period. The year just closed indicates that the prospects for the ensuing 12 months are brighter than at any time since 1914. The island continent of Australia proper and the com-

The island continent of Australia proper and the comparatively small island of Tasmania, which together form the Australian commonwealth, lie 6,000 miles from the United States of America and 10,000 miles from Great Britain. The area of the commonwealth is greater than that of the United States; nearly one-quarter the area of the whole of the British Empire, and more than 25 times as large as the British Isles. The population, however, is only about 5½ million people, and these two factors—huge area and relatively small population—make the problems of Australian railway operation particularly difficult.

#### Railways State-Owned and Operated

The railways of Australia are, generally speaking, owned either by the commonwealth or by individual states. There are a few exceptions, but these are principally short lines constructed for the conveyance of timber and coal or other minerals, and are more in the nature of tramways than railways. The railways occupy the coastal areas, and, speaking generally, the center of the continent is so far without railway facilities.

The total mileage of line open for traffic is approximately 25,000 miles, of which 5,378 are of 5 ft. 3 in. gage;

6,336 miles of 4 ft.  $8\frac{1}{2}$  in. gage; 11,994 miles of 3 ft. 6 in. gage, and 176 miles of 2 ft. 6 in. and smaller gage.

Unfortunately, the lack of uniformity in gage of the various railway systems in Australia sets up severe handicaps in the way of interstate traffic. The extra cost, delay and inconvenience occasioned by the necessity of transferring through passengers and freight at places where there are breaks of gage are becoming more serious year by year, as the volume of business increases. The unification of gage is, therefore, a matter that has occupied a great deal of attention. It has been decided to adopt the 4 ft. 8½ in. gage as standard throughout the commonwealth; but, as the estimate of the cost of converting all lines on the mainland to standard gage is \$277,000,000, the work has been deferred for the immediate present.

## New Lines Open for Traffic

During the year, the state of Queensland opened for traffic 106 miles of 3 ft. 6 in. gage line, making the total mileage in operation in that state 5,905 miles. New South Wales has now open for traffic a total of 5,318 miles, all 4 ft. 8½ in. gage, of which 202 miles were opened in 1923. The railways of the state of Victoria are practically all of 5 ft. 3 in. gage, and 38 miles were opened in 1923, making the total mileage open for traffic 4,322 miles. Both 5 ft. 3 in. and 3 ft. 6 in. gage lines are operated in South Australia, the mileage of the former being 1,164 and of the latter 1,210, making a total of 2,374 miles of line in operation. During

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the year 16 miles of 5 ft. 3 in. gage line were brought into operation. Western Australia has 3,555 miles of 3 ft. 6 in. gage railway, 16 miles of which were opened during the year, while Tasmania, whose railway gage is also 3 ft. 6 in., has a total mileage of 663.

# Transcontinental Railway

The commonwealth government operates the Transcontinental line which runs between Kalgoorlie in Western Australia and Port Augusta in South Australia, a distance of 1,052 miles. The whole of this line is standard gage. In crossing the Nullarbor Plain, so named because it is treeless, the railway runs without a curve for 300 miles, which is probably the world's record for unbroken tangent. In all its length of 1,052 miles, the line does not cross a single permanent stream of water. The construction of the trans-

ways Act. This act authorizes the construction by the Victorian government of 260 miles of railway, as a portion of the Victorian Railways system (46 miles in Victoria and 214 miles in New South Wales) together with the construction of four bridges over the Murray river—two to be constructed by Victoria and two by New South Wales. The Victorian government is committed to the construction of 200 miles of the above during the next four years.

Since June last Victoria has entered upon the construction of 185 miles of new railway line, of which 157 miles have been authorized under the Border Railways Act.

## Rail Motor Cars and Electrification

The problem of providing a satisfactory and economical train service on the many branch lines tapping the sparsely settled areas throughout the country districts of the various

AUSTRALIAN RAILWAYS, O	PERATING ST	ATISTICS, FISC	CAL YEAR 1922-1	923*	
	N. S. W.	Victoria	Queensland	S. Australia	W. Australia
General: Area in square miles Population Miles of line open for traffic. Total capital investment. Capital cost per mile of line. Population per mile of line. Financial Results:	2,190,820 5,318 \$433,885,593 \$81,590	87,884 1,600,624 4,341 \$315,193,327 \$72,608 369	670,500 805,636 5,905 \$229,093,649 \$38,793	380,070 515,135 2,359 \$100,183,190 \$42,219 217	975,920 348,357 3,555 \$93,118,582 \$26,195 98
Total earnings Operating expenses Net earnings Net earnings Percentage return on capital Operating ratio Earnings per average mile open. Operating expenses per average mile open. Net return per mile open Earnings per train mile. Operating expenses per train mile. Net return per train mile. Staff:	\$1,758,874 22,216,804 5.22 \$14,235 9,958 4,277 \$3,41 2.38	\$55,146,697 39,764,160 15,382,537 4.88 72.11 \$12,758 9,200 3,558 \$3,36 2.43 .93	\$26,343,144 22,911,313 3,431,831 1,49 86,97 \$4,461 3,878 553 \$2,41 2.08	\$18,035,081 13,518,318 4,516,763 4,58 74,95 \$7,645 5,730 1,915 \$2,90 2.17 .73	\$14,171,687 10,742,291 3,429,396 3,68 75,80 \$3,990 3,023 967 \$3,16 2,39 .77
Total number of employees		24,327 \$1,162	16,838 \$1,239	7,494 \$1,147	6,721 \$1,152
Number of passengers carried  Number of passengers carried one mile  Passenger earnings  Passenger earnings per mile of line.  Total passenger train receipts,  Passenger train receipts per mile of line.  Passenger train receipts per mile of line.	1,679,902,637 \$29,182,852 \$5,613 \$32,534,556	155,957,240 1,332,693,775 \$24,759,732 \$5,730 \$27,530.627 \$6,371 \$2.55	28,358,170 † \$8,081,709 \$1,371 \$10,351,455 \$1,754 \$0.93	24,475,170 282,387,213 \$5,233,180 \$2,221 \$6,175,067 \$2,670 \$2,15	17,830,292 \$4,055,043 \$1,142 \$4,725,465 \$1,332 \$2.53
Freight Traffic: Tonnage of paying freight hauled Tonnage of freight hauled one mile. Ton-miles per mile of line. Average carload—tons Average length of haul—miles. Freight earnings Freight earnings per mile of line. Freight earnings per ton mile. Freight earnings per train mile. Train Mileage:	1,250,186,472 251,683 9.5 85,96	8,419,282 754,772,724 174,635 9.3 89.65 \$24,072,513 \$5,570 \$6.035 \$4.12	\$15,991,689 \$2,707 \$1.84	3,677,625 412,717,461 174,985 6,99 112,23 \$11,557,250 \$4,899 \$0,031 \$3,38	2,939,238 235,369,446 66,264 7,25 80,08 \$8,593,505 \$2,420 \$0,04 \$3,19
Passenger train mileage	11,456,063 1,699,275 8,738,523 21,693,861	9,361,725 2,528,387 4,732,107 15,856,815	2,870,353 3,251,785 4,795,446 10,917,584	2,605,721 587,079 2,980,438 6,173,238	1,491,661 1,063,040 1,950,598 4,505,299
Rolling Stock: Locomotives Passenger cars Freight wagons Service wagons	1,341 2,188 21,577 1,906	789 2,587 19,211 728	698 902 14,771 405	494 716 9,231 551	421 485 9,670 493

\*English monetary units changed to American equivalents at par of exchange. Long tons and ton miles changed to short tons by multiplying by the factor 1.12.

†Figures not available.

continental line has been the means of bridging the span which previously existed between the Eastern states and Western Australia, thereby enabling the people of Australia to realize they are citizens of one great commonwealth. The commonwealth government also operates a line 199 miles in length of 3 ft. 6 in. gage running between Darwin and Emungalen in the Northern Territory.

#### New Line Construction

The greatest amount of construction of new lines is taking place in New South Wales, that state having in 1923 no less than 620 miles of line, all standard gage, under construction. Approximately 600 miles of 3 ft. 6 in. gage line are under construction in Queensland.

During the year, the "Border Railways Agreement" between the states of New South Wales and Victoria was ratified by the passage by both of them of the Border Railstates, is receiving close attention. New South Wales, Victoria, and Western Australia are experimenting with internal combustion engines driving rail motor cars, while Queensland is trying steam driven cars with coke as fuel.

The project for the conversion of the Victorian suburban railway system from steam to electric operation, which has been in progress for 11 years, was completed last April. The Victorian Railways have now the distinction of operating the largest electrified suburban service, converted from steam operation, in the world, and one of the greatest power generating plants in the Southern hemisphere. The project has included the erection of a power house of an installed capacity of 105,000 horse power; the laying underground of 78 route miles of 20,000-volt transmission cables; the erection of 51 route miles of overhead 20,000-volt transmission lines, and the equipment of 346 miles of single track with 1,500-volt direct current conductors. In addi-

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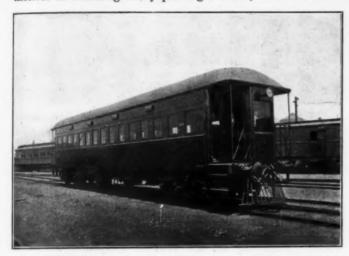
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rsely rious tion, 16 sub-stations having a total installed converting capacity of 116,000 horse power, have been erected, and 710 motors and trailers fitted with electrical equipment. The electrified system comprises a total of 125 route miles of double track and 20 miles of single track. While a period of about 11 years was occupied in the work of conversion, great difficulties were experienced in obtaining supplies of suitable material from abroad, not only during the progress of the war, but after its termination.

#### Electrification Increases Business

A marked increase in passenger business has resulted from the electrification. The greater effectiveness of electric multiple unit train operation as compared with steam locomotives in handling heavy passenger traffic, has enabled an

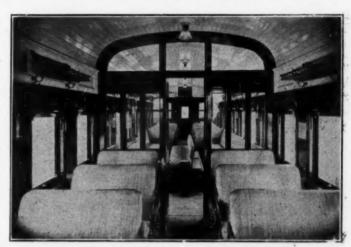


A Gasoline Motor Car on the New South Wales Railways

average increase of about 35 per cent to be made in the total number of trains scheduled—the cost of which, under steam traction, would have been prohibitive. The fast and frequent electric train service now provided during the slack hours, has encouraged considerable additional traffic. Since electric operation was commenced in May, 1919, there has

traffic brought to the railways by electrification is equal to not less than 20,000,000 passenger journeys per annum.

Under steam traction it was not readily practicable to vary the size of trains according to fluctuations in the traffic. The remarkable flexibility of the electrical service, however, enables the length of suburban trains to be decreased

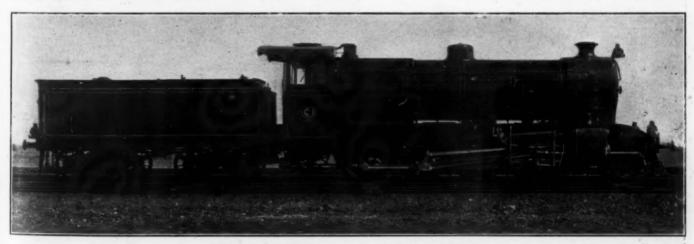


Interior of Motor Car, N. S. W. Railways

or increased in accordance with requirements, thus keeping down necessary car mileage.

#### Underground City Railway for Sydney

Quite the largest work at present in course of construction in the commonwealth is the underground railway to serve the city of Sydney, the capital of New South Wales. Sydney, with its immediate suburbs, has a pouulation of more than a million. To improve the traffic facilities the existing suburban railways are now being electrified and extended into and around the city, forming a city loop from which railways will lead to the western and eastern suburbs, at present served by a street railway service system. The total estimated cost of this work is approximately \$50,000,000. Jointly with the construction of the city railway is the



Standard Freight Locomotive, Victorian Railways

been a large development in the suburban passenger business, the total number of suburban passenger journeys having increased from 104,000,000 in the year 1919 to 146,000,000 for the year 1923, representing an advance of 40 per cent. During the ten years preceding the introduction of electric operation, the annual rate of increase in the suburban passenger traffic averaged approximately 4 per cent, and after allowing for such increase, the additional

construction of a bridge spanning Sydney harbor in one clear span of 1,600 ft., and accommodating railway, vehicular and pedestrian traffic. The cost of this bridge will be approximately \$30,000,000. Tenders for the bridge were recently invited throughout the world.

When the project is completed the suburban steam railways, now terminating at Central Railway Station on the city side of the harbor, and at Milsons Point on the northern side, will be electrified and passengers brought into the city and distributed over four underground and two openair stations on the city loop. The stations on the city loop will be approximately 3,300 ft. apart, and separate entrances and exits are to be provided so that the ingoing and outgoing passengers will never meet. The ramps and pas-

Interior of Salon Car, Transcontinental Railway

sages have been designed on the experience of New York, to provide for 30 to 35 passengers per foot of width per minute without overcrowding; stairways, 20 passengers up and 18 down per foot of width per minute; and escalators 10,800 passengers an hour.

Where the city railway passes under private property the

the height of the building which may be erected thereon owing to the railway passing beneath.

The track will not be ballasted where underground; the ties are being laid on the concrete floor of the tunnel, a drain being formed in the concrete along the center of each track under the ties.

The first section of the City Railway, from Central Railway Station to St. James' Station, is now well in hand, and it is anticipated will be opened for traffic early in 1925.

#### Public Relations

During the year much has been done by the various Australian railways to bring about a better spirit of understanding and co-operation between the users and the railways. In New South Wales and Victoria, especially, a sincere effort has been made to create an intelligent public appreciation of the railway problems. The general public has been given, through the medium of the press and by personal contact with the administrative officers of the railways, a clear insight into railway operations and the difficulties under which the railways must work. This policy has been of great advantage, not only to the public generally, but to the management.

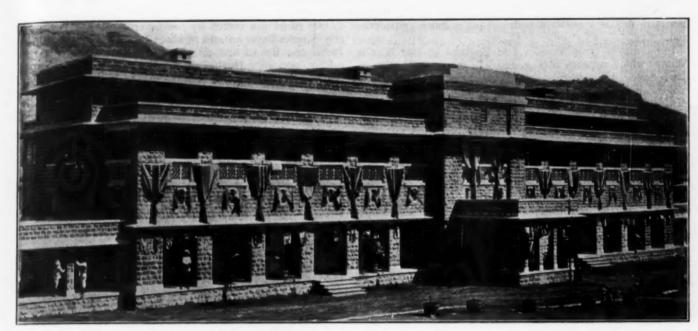
The lead in this direction was taken by the New South Wales administration by the appointment of a publicity officer, and the creation of a bureau of information, the duties of the latter being the collation and dissemination of railway information, not only locally, but throughout the world. A bulletin featuring some special phase of railway operation in New South Wales is issued monthly by the bureau of information and circulated to the principal railroads in the world. These bulletins have attracted much attention to the state, and have received recognition throughout the world. Practically all the railroad companies to which these bulletins are sent reciprocate by the regular supply of



Standard Passenger Locomotive, New South Wales Railways-Tractive Power 30,228 lb.

steel frame construction and roof of subways will be designed to provide for warehouse buildings 150 ft. high being erected anywhere over the railway in the future. This is the maximum allowed by the city building regulations, so there will be no blot on the title-deeds of any property as to

information in regard to their systems, thus enabling the New South Wales Railways to keep informed concerning railway operations in other countries. The information received from abroad forms an excellent basis for measuring the efficiency of railway operation in Australia.



Railway Hospital at Igatpwi on the Great Indian Peninsula

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# India's Railways Practicing Rigid Economy

Finances Thus Improved—Much New Construction Needed—Learning from America

By Railway Age's Correspondent in India

THE YEAR 1923 was one of change for the Indian railways. Old methods which had grown up with the railways had to be discarded at the call of economy; new methods had to be learnt. Retrenchment was the clarion call which sounded from North to South and East to West and its effects were felt even in distant villages where the white man is not often seen.

Changes are not always pleasant at first but there can be little doubt that the Indian Railways will make a far better showing for 1923 than they did in 1922. Even the figures for the last financial year, which in India is from April 1 of one year to March 31 of the next, show greatly improved results. For example, the rate of interest earned by the government on the capital invested in government-owned lines increased from 3.41 per cent for the year ending March 31, 1922, to 4.86 per cent for the year ending March 31, 1923.

#### The Inchcape Committee and Economy

The urgent necessity for economy was the reason for the visit of Lord Inchcape's Committee on Retrenchment to India during the winter of 1922-23 and in its report, dated March, 1923, this committee recommended the "axe" with no uncertain hand. Railways as one of the most important departments of the government of India came under their inspection and many far-reaching recommendations were

The committee stated as its opinion that India could not afford to subsidize the railways and that steps should be taken to curtail operating expenses as necessary in order to ensure that not only would the railways as a whole be on a self-supporting basis but that an adequate return should be obtained for the large capital expenditure which has been incurred by government. They considered that a fair return would be  $5\frac{1}{2}$  per cent. It was with this object in view that

the recommendations were made; but, as only natural, all the recommendations of a committee which had only a limited time at its disposal have not proved practicable or in the best interests of India, and the spirit rather than the letter of some of its proposals have been followed.

Among other minor changes, it recommended that the



Building a Bridge on the North Western (India)

agents of railways (or presidents, as they are known in America) should be designated general managers, which is the nomenclature in use in England.

## Railway Consolidation

It also recommended that the preparation of a plan of consolidating the railways should be taken up forthwith but naturally this is a question which requires much considera-

India differs from America and England in that it is a country which requires at once, and will require still more in the future, a large increase of railway mileage. When it is remembered that the population of India is about three times that of America while the mileage in operation is only about one-seventh of that in America, it will be realized that there is room for expansion. India is slowly becoming more industrialized, although it will remain for many years to come mainly an agricultural country.

There is at present very little mileage which can be considered as competitive and, with the vast distances, the varied climatic conditions, the large number of different languages and dialects, etc., met with in India, the possible economies or advantages to be obtained from consolidation needs careful consideration.

# Railway Finance

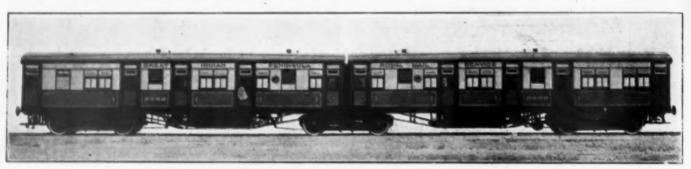
As was stated in the report on the operation of Indian railways for 1922, the Railway Board, which conforms in many ways to the Interstate Commerce Commission, is now controlled by a chief commissioner of railways.

27,005 miles are owned by the government and this property is spread over an area of about 1,800,000 square miles in India and Burma and ministers to the needs of some 320 million persons. During the year ending March 31, 1923, there was an increase in mileage of 352 miles, while during 1923 many surveys were in progress and new construction contemplated especially in the coal bearing areas as the prosperity of the country depends to a large extent on cheap transportation which is only made possible through cheap fuel and power.

### Cheapest Transportation in the World

Even as it is, transportation in India is probably the cheapest in the world and this is borne out by the fact that the average receipts per ton mile during the year 1922-23 were 1.00 cent against 1.11 cents in America in 1921 and the average receipts per passenger mile for the same year were 0.64 cents against 3.13 cents in America.

Economy is being further effected by vigorous steps being taken to reduce the amount spent on the payment of claims and in this Indian railways have much to learn from Amer-Stores' balances is another question which is receiving close attention. The difficulties of a country which depends



Articulated Cars on the Great Indian Peninsula

recommendation of the Inchcape Committee the Railway Board has been further strengthened by the addition of a financial commissioner, whose special duty will be to ensure that there is sufficient justification for the expenditure of the large amount of money allotted yearly for capital additions. The Indian legislature and the government of India have agreed to the expenditure of 50 million dollars over a period of five years on additions and betterments to existing lines and on building new lines; and, inasmuch as much of this capital expenditure requires a corresponding expenditure on revenue account as well, it will be realized that the duties of the financial commissioner will be no sinecure.

The question of the separation of the railway budget from the general budget of the country is a question that is being carefully considered at present. The difficulty of providing for the proper development and efficient operation of a continuous commercial concern by means of an annual budget system which implies that a concern goes out of business on March 31 and starts again on April 1 is obvious, as well as the disturbing effects which the fluctuations of the railway and central budgets may have on each other.

# Reorganization of Railway Board

A reorganization of the Railway Board is also under consideration and the final proposals of the government of India are at present being scrutinized by the British government. The main object of the reorganization is to enable the chief commissioner and his members to visit the various railway systems more often by relieving them of much of the work which at present keeps them at headquarters.

The vast extent of the property in the form of railways owned by the government may be realized when it is remembered that out of 37,618 miles of line existing in India,

for many of its essential stores on supplies from England, Europe and America can be realized. When supplies could not be depended upon and transportation by sea was irregular, it was essential to maintain sufficient stocks, but now that trade is easier and India is becoming more self-supporting, these stocks are being considerably cut down.

#### Statistics Adapted from U.S. A. Practice

There has been a very great change in the statistics in force on the Indian railways. As a result of the report\* of a committee which was issued in April, 1923, revised and up-to-date statistics were introduced on October 1, 1923. In the place of yearly statements, monthly statements based in many ways on the form of the statements supplied by all railways to the Interstate Commerce Commission in America have been introduced. They have not at present reached their final form as certain changes will probably be introduced as a result of the experience gained during the first six months. American readers may probably not know that Indian railways were one of the first to introduce ton-mile statistics, these having been compiled on the East Indian Railway in 1870 and made compulsory for all railways in India in 1872.

#### Standard Cars

India has been working for some years on drawing up specifications for standard freight cars and passenger car underframes, and sample cars were constructed according to the designs drawn up by a special committee. These were submitted to the scrutiny of experts in their use, maintenance and construction and a second committee was then appointed to revise the designs in the light of the experience gained.

\*See Railway Age, October 6, 1923, page 635, and October 13, page 675.

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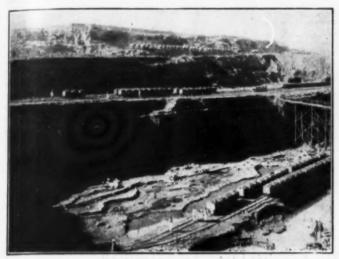
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The final standard designs with detailed specifications were issued in September, 1922. Since that date, most of the new cars ordered have been in accordance with these specifications. Many of the same reasons why cars should be standardized exist in India as in America, while the facts that there is a car pool and that the majority of the railways in India are owned by government, although only a small proportion are operated directly by the government, make



An Open Colliery Owned by the Great Indian Peninsula Ry.

many of these reasons stronger. Indian railway officers will note with interest the report of the American Car Construction Committee issued in 1923.

#### **Automatic Couplers**

A committee of Indian mechanical officers was appointed to consider the report of the special officer sent to America to study American practice as regards automatic couplers (called "central buffer" couplings in India) and this committee has

has lately been brought into service on the Great Indian Peninsula Railway. As shown in an accompanying illustration, the car consists of two separate bodies and underframes. Each measures 50 ft. overall with 1 ft. 1½ in. between bodies, both of which are mounted on three Pullman bogies (i. e. trucks). Each body consists of two four-berth compartments and two coupé compartments with lavatories and servants' accommodations. The car is electrically lighted and equipped for running in parallel block lighted trains.

#### An Experimental Mallet from America

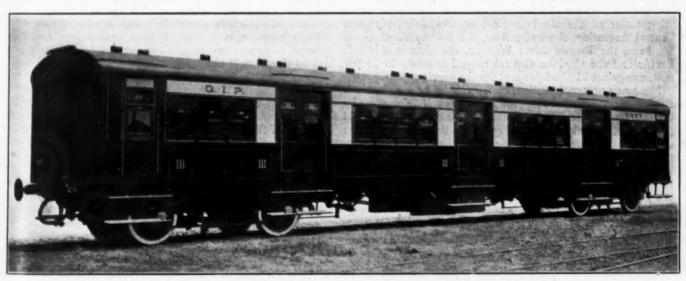
An order has been placed in America for a Mallet locomotive 5 ft. 6 in. gage, for the North Western Railway. This line has some very heavy grades on its frontier sections and if it is found that the use of a Mallet locomotive reduces the difficulties of operation on these sections, it is expected that further orders will be placed.

#### **Employee Education**

In the writer's summary of Indian Railway Developments which appeared in the Annual Review Number of the Railway Age a year ago, attention was drawn to the difficulty experienced with the question of personnel in India. Until recently opportunities for the technical training of Indians were lacking and in the absence of opportunities, naturally few Indians were able to reach the standard required for the superior posts. Interesting developments were in their initial stage, but in view of the general policy of the government of India as regards the "Indianization" of the services it was felt that something more should be done. Accordingly, a special officer was deputed to study the question and, as a result of his report, it is proposed to co-ordinate this work and to afford greatly improved facilities for the training of the staff in all parts of India.

#### British Empire Exhibition

The Indian railways are taking a keen interest in their exhibits for the British Empire Exhibition which will be held in London in April, 1924, and it is hoped to put up a thor-



New Third Class Coach on the Great Indian Peninsula

recommended the introduction of the central buffer coupling in India.

This question is now being further examined and certain trials are being carried out to find out the best way of overcoming the difficulties of the transition period. While it is more or less certain that a central buffer coupling will be introduced in India, this is a question which cannot be decided in a hurry.

The first example of an articulated passenger car in India

oughly representative exhibit. In addition to models of various types of rolling stock, ferry steamers, etc., the gradual growth of transportation in India will be shown from its earliest stages when loads were first carried on the man and on the bullock; through the wheeled transport stage to the early railway stage and ending with the present methods of transportation. The models will be made as realistic as possible and the usual crow sitting on the bullock's back and picking off ticks will find a place.



Retiro Station, Buenos Aires

# A Good Year for the Railways of Argentina

Some British Owned Lines Earn Record Net—Government Roads Make Many Extensions

By M. T. Meadows

TET RECEIPTS of a number of the large British-owned railway systems in Argentina for the fiscal year ended June 30, 1923, were the largest in history. General business conditions in the country are gradually improving, bringing greater traffic, and at the same time operating expenses are decreasing. The outlook for the present fiscal year is even brighter with larger crops in prospect. The operating ratios of the six large British companies, viz., the Central Argentine, the Entre Rios, the Buenos Aires Great Southern, the Buenos Aires Western, the Buenos Aires & Pacific and the Cordoba Central ranged from 62 to 74 per cent, as against 71 to 85 per cent for the previous year.

Not much new construction, however, is being done by these British-owned lines. Most of the new work is being done by the government lines, and the lines thus built are constructed primarily to develop the country rather than with the idea of immediately realizing a large return from them. Transportation facilities are, nevertheless, inadequate, and this fact has long been recognized. There are still vast territories in Argentina which, though capable of producing great wealth, are lagging far behind in the march of progress due to the dearth of transportation. It is in such regions that the Argentine government is carrying out its comprehensive construction program.

#### The New Transcontinental Line

The first move of the government toward the execution of its present plans was the decision to build another transcontinental line of uniform (meter) gage in order to supplement the traffic now passing over the Buenos Aires-Valparaiso route. This line is of necessity international in character. An agreement was reached whereby the Chilean government would co-operate with Argentina in the construction and operation of this line which is to link up Salta (Argentina) via Huaitiquina with the Chilean State Railways somewhere in the neighborhood of Sompaya (Chile),\* thus giving the

northern provinces of Argentina easy access to the Pacific through the Chilean port of Antofagasta and providing a shorter haul to a seaport.

The advantages of this line will be great since the production of Northern Argentina and Northern Chile complement each other; that is to say, Northern Argentina, an agricultural and pastoral country, can supply Northern Chile, a mining country par excellence producing very little foodstuffs, with its requirements in the way of food and receive from Chile nitrates and other products. The greatest drawback at present to the prompt termination of this line is the opposition met with in the Chilean Congress on the part of the bloc influenced by the farmers of Southern Chile, who apparently believe that the construction of this line would mean the loss by them to Argentina of the Northern Chilean market for the produce of their farms and ranches. It is probable, however, that the influence of senators and deputies from Northern Chilean provinces together with the pressure from Argentina that is being brought to bear on the discussion, will eventually secure ratification for the Barros Jarpa-Noel treaty, thus assuring the construction of the road on the Chilean side. If the Chilean opposition is not done away with, then Argentina has gone into a very costly experiment, for she has already spent \$40,000,000 Argentine paper\* in the construction of the proposed line across the Puna desert—a no-man's land, the haunt of condors and vicuñas.

At present construction work is being undertaken in three separate points on the Argentine side despite considerable handicaps, such as bad weather which prevailed throughout the winter (June, July and August) and difficulties in transporting supplies of materials and foodstuffs. The section between Rosario de Lerma and Gólgata has been practically finished with the exception of several tunnels and bridges. Much overtime is being put in by all gangs in an effort to open this portion of the line to traffic in late December or early January. Once this section has been completed it will

<sup>\*</sup>For a description of this line with a map see the Railway Age of December 30, 1922, page 1237.

<sup>\*</sup>The Argentine paper dollar is worth about 31 cents at present rates of exchange.

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Along the section from Puerta de Tastil to Abra de Chorrillos sites have been selected for all stations. About 80 per cent of grading has been done, and it is believed that the remainder of it will be finished during the first months of 1924. Work on this section is proceeding slowly, owing to the intense cold in this region which ranges from 12,000 to 16,000 feet above sea level. Grading has been practically finished for about 190 miles from Salta (the Argentine terminus of the line) and the major portion of grading is now being done in the neighborhood of San Antonio de los Cobres, Mina Pompeya and Concoroia. Practically all the stations and yard tracks have been constructed over a distance of some 120 miles from Salta, and rails have been laid up to Puerta de Tastil with the exception of gaps awaiting the completion of bridges and tunnels.

#### Construction in the South

In point of importance, in the government's program of railroad construction, Patagonia (in the southernmost part of the country) takes second place. The Patagonian region, including the territories of Rio Negro, Neuquén, Chubut and Santa Cruz, is known to possess large resources that only await transportation facilities and capital to be developed to a point where they can be considered as a vital addition to the economic life of the country. One of the most urgent needs of Patagonia is the right kind of immigration and this can only be fostered when transportation facilities are provided. Moreover, it is hoped that through these facilities it will be possible to give added impetus to the back-to-the-land movement, for the problem of congestion in cities is becoming a serious one in Argentina, essentially a pastoral and agricultural country. It is quite reasonable to believe that once Patagonia is endowed with a system of railroads great numbers will be drawn from the large cities, lured by the prospects of obtaining quick wealth in a newly opened country.

Recognizing this fact the officers of the State Railways have worked out comprehensive plans for providing this great region with transportation facilities. These plans contemplate the building of an extensive system of narrow gage (75 centimeters, i. e., 29.52 in.) lines to link up with the existing lines of meter and broader gage. Many miles of the narrow-gage road have already been built and a number of Mikado type locomotives have been purchased for them from the Baldwin Locomotive Works.

In the same way the State Railways are striving to provide Northern Argentina with railway connections with Chile, they are also putting forth their best efforts to provide more satisfactory communications with Bolivia. Since Bolivia lost her maritime provinces on the Pacific her communications with foreign countries have been dependent upon the good will of her neighbors who have never placed serious obstacles in the way of Bolivia's foreign trade. Without doubt Bolivia of all South American countries has a larger handicap to overcome in selling her products to foreign countries and importing the goods required by her growing Due to the mountainous nature of the major population. portion of the republic, as also to the scantiness of population and lack of traffic, railroads in Bolivia have not been developed to any great extent, with the result that Bolivian industries are lagging behind those of many other Latin-American countries.

Fortunately it would seem that at present both the Argentine and Bolivian governments are determined to give the problem of transportation between the two countries serious study and are therefore making a decided effort to provide the necessary railroad facilities at the earliest possible moment. The Argentine Republic has pushed her State Railways to La Quiaca on the Bolivian frontier. The line

which is destined to unite Tupiza, Atocha, and La Paz, as well as Oruro, is not finished yet, but construction work is progressing so rapidly that the section between La Quiaca and Tupiza will probably be opened to traffic by the end of the present year. Once the 120 miles that are needed to link up Atocha in Bolivia with La Quiaca in Argentina are built this will reduce traveling time between Buenos Aires and La Paz by at least two days. Funds for the completion of the line in Bolivia are in the hands of the government and construction work is being carried out by a firm of American engineers. The line between Tupiza and Atocha will, however, not be finished before some two years have passed. At present negotiations have been initiated between the Argentine and Bolivian governments for the construction of another line from Embarcación on the Bermejo river (via Yacuiba) to Santa Cruz de la Sierra in the heart of the rich Eastern plateau of Bolivia. Construction work on the Argentine side is being pushed ahead rapidly, and once rails are laid as far as Santa Cruz, traffic will be established with the great tributaries of the Amazon that will carry Argentine merchandise to the borders of Peru and Brazil. The construction of this line will also be of great assistance to several American oil companies now operating in the southeastern portion of Bolivia.

At a recent Cabinet meeting the question of funds for railway construction during 1924 was taken up. It was then decided to petition Congress for authorization to issue bonds for the sum of \$340,000,000 Argentine paper (\$105,-400,000 U. S. money at present exchange rates), interest and amortization on this sum to be met with profits derived from the operation of the State Railways once the additional roads contemplated have been opened to traffic.

The State Railways made "a big hit" with the first excursion train of tourists who visited all the northern provinces and territories served by their lines. The special train carrying the excursionists was built to order and provided with every possible convenience. The locomotives were furnished by the Baldwin Locomotive Works and the cars were assembled in Argentina from supplies purchased from the Middletown Car Company. The train was made up of an observation car, two Pullman day coaches, two dining cars, one kitchen car, seven sleeping cars, one baggage car equipped with wardrobes, one car having radio telephone and telegraph receiving and transmitting stations, a car equipped with tub and shower baths, a car equipped with a light and power plant, and another tank car for hot water.

#### Activity in the Province of Buenos Aires

The Government of the province of Buenos Aires is vying with the national government in its efforts to extend its system of government-owned roads. At present the province has 343 miles of line. The main line leaves the capital of the province (La Plata) and runs westward to the border of La Pampa Territory, crossing some 12 to 14 of the richest partidos (governmental divisions considerably larger than American counties) of the province. Rates over the provincial lines are from 20 to 50 per cent below those charged by the private owned roads. As a rule a small profit is made on this system each year. Today the plans for extending the system recently approved by the provincial government are being put into effect by local contractors.

Under the leadership of the Confederation of Rural Societies an aggressive campaign is being waged against deferential freight rates which, it is alleged, are being granted by some private owned lines, thus favoring one district of the country over another. The Confederation has drawn up several resolutions relative to this matter and has petitioned Congress to pass laws intended to secure equal treatment.

The Buenos Aires Great Southern has under contemplation the construction of 1,200 miles of narrow-gage lines to act as feeders for main lines.

# General News Department

The American Society for Steel Treating will hold its winter sectional meeting at the Hotel Seneca, Rochester, N. Y., January 31 and February 1, 1924.

### Railroad Consolidation Discussed

## by American Economic Association

A number of papers and a general discussion on the topic of railroad consolidation occupied one of the sessions of the annual meeting of the American Economic Association at Washington on December 28. The papers included "Economic Purposes and Limitations of Consolidation," by Prof. Winthrop M. Daniels, Yale University; "Geographical Limitations of Consolidated Systems," by Prof. William Z. Ripley, Harvard University; "Financial Processes of Consolidation," by A. J. County, vice-president, Pennsylvania Railroad, and "Advantages and Disadvantages of Railway Consolidation," by Prof. Lewis H. Haney, New York University. These papers were discussed by Walter M. W. Splawn, of the University of Texas; I. Leo Sharfman, University of Michigan; T. W. Van Metre, Columbia University; L. H. Sorrell, University of Chicago, and C. S. Morgan, Institute of Economics. There was also a round table conference on transportation, of which Prof. Emory R. Johnson, of the University of Pennsylvania, was the chairman.

## First Annual Banquet of the K. R. & C.

Cressmont, Kentucky, is the date-line of our most recent news item concerning public relations; a small town on the Kentucky, Rockcastle & Cumberland Railroad, about 125 miles east of Louis-This railroad is only eleven miles long and it occupies only 1/2-inch in the Official Guide; but its officers are up-to-date. Aiming to give to the public the best possible service and thus to cultivate a permanent friendship they began by cultivating the friendship of the employees; and on the afternoon of December 21 gave them (and themselves) a banquet: the "first annual banquet of the officers and employees," etc. From the menu and the notes printed on it sent to us by J. A. Kauffman, assistant general manager, together with Mr. Kauffman's letter, it appears that the occasion was all that could be desired, both as to a spirit of brotherhood and intelligent devotion to the public service; that is, to the best quality of railroading. The uniqueness of this banquet consists in the fact that all of the employees of the road were present; at least we so assume from the list of names; five officers and 25 employees. As to just how this plan of cultivating the acquaintance of employees can be adapted for use on the Louisville & Nashville or the Pennsylvania or the New York Central, Mr. Kauffman offers no suggestion; but we give the facts for what they are worth. The president of the road is W. M. Jones, Huntington, W. Va. H. B. Jones, vicepresident and general manager, and all the other officers, have their headquarters at Louisville.

#### Baltimore & Ohio to Electrify Staten Island Lines

Plans are being me to for the electrification of the Baltimore & Ohio lines on State Island, New York. It is expected that the first section to be andertaken will be the line of the Staten Island Rapid Transit Railway from St. George to Tottenville and South Beach. This includes about 16 miles of line carrying suburban passenger traffic and will involve an expenditure of approximately \$6,000,000. After this, the electrification of the remaining passenger lines will be completed and attention will then be given to the freight lines. The character of construction and type of equipment to be used has not yet been decided upon.

A tunnel to Staten Island, connecting with the present subway system on Manhattan Island, may be built, but whether subway trains from Manhattan will be run through the tunnel and then over the lines on Staten Island has not been determined. The Staten Island lines at present bring 32 trains into St. George within two hours every morning and so many additional trains could probably not be accommodated in the present subway system of Manhattan. To meet this condition additional subway systems would have to be provided on the lower part of Manhattan Island as well as the tube to Staten Island.

That the electrification of the Staten Island lines cannot be completed by January 1, 1926, as provided for in the Kaufmann Act is a foregone conclusion. As much of the work as possible will be completed by that date. After that time an extension of time is hoped for.

Another possibility is that the act may be revised so that only a part of the freight lines of the railroad will have to be electrified.

#### Meeting of the American Society for Testing Materials

It was incorrectly reported in the December 29 issue of the Railway Age that the next meeting of the American Society for Testing Materials would be held on January 23 to 27, inclusive. The correct dates of the meeting are June 23 to 27. The place of meeting will be the Chalfonte-Haddon Hall, Atlantic City, N. J.

#### Henry C. Hall Elected Chairman of I. C. C.

Pursuant to the policy adopted on January 13, 1922, that the term of office of chairman of the Interstate Commerce Commission shall be filled from year to year in the order of seniority



H. C. Hall

of service, Commissioner Henry C. Hall has been unanimously elected chairman of the commission to serve from January 1, 1924, for the ensuing year. Mr. Hall has been a member of the Interstate Commerce Commission since 1914. He was born on January 3, 1860, at New York City. He from was graduated Amherst College in 1881 and from Columbia Law School in 1883 and was admitted to the bar at New York in 1883. From 1885 to 1892 he practiced law in Paris, France, and during that time was counsel of the United States Legation for four

years from 1888 to 1892. In the latter year he returned to America, locating in Colorado Springs, Colo. Subsequently he became general attorney for the Arkansas, Louisiana & Gulf. He was also general counsel for the Colorado College at Colorado Springs and for various corporations. He was mayor of Colorado Springs from 1905 to 1907. Mr. Hall lectured on law at Colorado College and was vice-president for Colorado and member of the general council of the American Bar Association from 1912 to 1913. He was commissioner for Colorado on uniform state laws in 1912 and was president of the Colorado State Bar Association in 1911 and 1912. Mr. Hall is now a member of Division 3 of the Interstate Commerce Commission and during the past two years he has been particularly in charge of the Interstate Commerce Commission's work on formulating a plan for the consolidation of the trainsportation act.

# Commission and Court News

# Interstate Commerce Commission

#### Passenger Fares Reduced

The Interstate Commerce Commission has rendered a decision reversing a decision in the same case in 1920 and finding that interstate passenger fares to and from points in Arizona, Nevada and New Mexico on the principal lines of the Southern Pacific, Santa Fe, Western Pacific, Los Angeles & Salt Lake, Rock Island, El Paso & Southwestern, Denver & Rio Grande and Arizona Eastern, but not on the Grand Canyon, are unreasonable and unduly prejudicial to the extent that they exceed similar fares and charges to and from points in other states. Passenger fares on portions of these lines range from 4.8 cents to 7.2 cents a mile, whereas the general basis is 3.6 cents.

#### I. C. C. Finds No Substantial

#### Discrimination in Ohio Rates

In an important decision involving relations between intrastate and interstate freight rates the Interstate Commerce Commission has discontinued its proceeding in the matter of intrastate rates on sand, gravel, crushed stone and vitrified paving blocks within the state of Ohio, on the ground that no disparity in rates so substantial as to operate as a real discrimination against and obstruction of interstate commerce had been found. On September 2, 1922, the steam carriers operating in Ohio had filed with the commission a petition alleging that the rates established in compliance with the orders of the Ohio commission were violative of sections 13 and 15 of the interstate commerce act. The commission thereupon instituted its investigation upon its own motion. As a basis for its finding the commission referred to the statement by the Supreme Court of the United States in Wisconsin Railroad Commission vs. Chicago, Burlington & Quincy, in which the court said that action of the Interstate Commerce Commission to relieve discriminations caused by action of state authorities should be directed to substantial disparity which operates as a real discrimination against and obstruction of interstate commerce and must leave appropriate discretion to the state authorities to deal with intrastate rates. The commission found that there was no general level of rates on the commodities under consideration which it had found to be fair to interstate commerce in the territory involved.

# Court News

## Railroad Not Liable for Injuries

## to Licensee on Freight Platform

The Texas Court of Civil Appeals holds that a merchant on a cotton platform to weigh cotton he had bought to ascertain the price, in which transaction the railroad was not interested, was a mere licensee, though the cotton would probably afterwards be shipped over the company's road, and it was not liable for his personal injuries from defective planking.—Kruse v. H. & T. C. (Tex. Civ. App.) 253 S. W. 623.

#### Precautions Necessary by Pedestrian at Crossing

A pedestrian at a crossing in a city, hurrying to take a car, ran into the side of an engine near the driving wheel. In an action for his injuries it appeared that he did nothing to see whether a train was approaching except to look when 40 ft. from the track. The Massachusetts Supreme Judicial Court holds that a verdict for defendant was properly directed, the plaintiff not being in the exercise of due care. The fact that the plaintiff was "totally deaf" and could not hear the signals or the noise of the approaching train required him to be more alert in the use of his other senses. He was not entitled to rely wholly on the flagman's absence, and assume that he could safely cross.—Allen v. B. & M. (Mass.) 139 N. E. 511.

# Equipment and Supplies

# Locomotives

THE TEXAS-GULF SULPHUR COMPANY has ordered one locomotive from the American Locomotive Company.

# Freight Cars

THE OLIVER IRON MINING COMPANY is inquiring for 7 flat cars 41 ft. long.

THE SEABOARD AIR LINE is now asking for prices for the rebuilding of 300 steel phosphate cars.

THE CHESAPEAKE & OHIO is asking for prices for the repair of 750 hopper bottom coal cars, and 750 flat bottom coal cars.

THE NEW YORK CENTRAL has given an order to the Ryan Car Company for the conversion of 600 old box cars to double deck stock cars.

THE LOUISIANA OIL REFINING COMPANY has made arrangements with the First Trust and Savings Bank, Chicago, to finance the purchase of 548 tank cars.

THE FRUIT GROWERS EXPRESS, reported in the Railway Age of December 22 as inquiring for 1,000 steel underframes for refrigerator cars, has placed an order for this equipment.

# Passenger Cars

THE SOUTHERN PACIFIC is inquiring for 50 passenger cars.

THE CHICAGO, BURLINGTON & QUINCY is inquiring for six dining cars.

THE WESTERN PACIFIC, reported in the Railway Age of December 8 as inquiring for 500 refrigerator cars, has increased this inquiry to 775.

THE CHICAGO & ALTON has ordered two combination observation and lounge cars, six parlor cars, four coaches, two dining cars, two combination baggage and smoking cars and two mail cars from the Pullman Company.

# Machinery and Tools

THE YAZOO & MISSISSIPPI VALLEY has ordered one 15-ton pillar crane from the Whiting Corporation.

THE NEW YORK CENTRAL has ordered one five-ton 35-ft. span, one motor overhead traveling crane from the Whiting Corporation.

THE NEW YORK, CHICAGO & St. Louis has ordered one five-ton 21-ft. radius electric jib crane for use at Cleveland, Ohio, from the Whiting Corporation

The Erie has bought from the Westinghouse Electric & Manufacturing Company two new 400 hp. B. & W. boilers and two Westinghouse new model underfeed stokers for installation in its shops at Hornell, N. Y. These stokers will be driven by motors

THE CARNEGIE STEEL COMPANY, Homestead, Pa., has bought from the Westinghouse Electric & Manufacturing Company, three new model multiple retort Westinghouse underfeed stokers of the dump grate and extension agitating grate type. The company has also bought three new 834 hp. Stirling boilers.

# 'Signaling

THE NEW YORK CENTRAL has extended to January 15, at noon, the time within which bids will be received for the installation of automatic train-control apparatus on five divisions of the New York Central system.

# Supply Trade News

A. E. Tregenza, for the past eleven years general sales manager of the Economy Fuse & Manufacturing Company, Chicago, has resigned.

The Allegheny Steel Company, Brackenridge, Pa., has opened an office at 855 Peoples Gas building, Chicago, in charge of Banks E. Eudy.

The Armstrong Cork & Insulation Company, Pittsburgh, Pa., has removed its Minneapolis, Minn., office to larger headquarters at 316 Third avenue, North, Minneapolis.

W. J. Behlke, formerly of the Chicago & Northwestern and for some years past mechanical representative of Barco Manufacturing Company, Chicago, has been appointed district sales manager.

Col. Edwin M. Hadley, vice-president and treasurer of the Chicago-Cleveland Car Roofing Company, has been appointed chairman of the Railway Supply division of the Ways and Means committee of the Chicago Association of Commerce for 1924.

A. H. Pease, secretary of the Wason Manufacturing Comany, Springfield, Mass., a subsidiary of the J. G. Brill Company, Philadelphia, Pa., has been elected vice-president to succeed Henry Pearson, deceased; Charles F. Johnson has been appointed general manager; Walter Abrahams, secretary and clerk, and R. T. Foster, superintendent.

LeGrand Parish, who has been president of Lima Locomotive Works, Inc., since 1918, has resigned, to devote his entire attention to the American Arch Company, Inc., of which he is also president. He will, however, remain on the executive committee of the former company. J. S. Coffin, chairman of the board, has been elected also president of Lima Locomotive Works, Inc., to succeed Mr. Parish.

Joseph F. Farrell, who has been general manager of the Nathan Manufacturing Company, New York City, for the past seven years, has been elected vice-president with head-

quarters in New York City, as was announced in the Railway Age of December 29. Mr. Farrell entered railroad service on December 12. 1889, as a clerk on the Lake Shore & Michigan Southern. In September, 1906, he was appointed chief clerk in the purchasing department of the Lake Erie & Western. The following April he appointed assistant purchasing agent of Michigan Central and on September 1, 1907, he became purchasing agent of that road. Mr. Farrell left the railroad field in July, 1912, to



J. F. Farrell

become vice-president of the American Materials Company and since August, 1916, has served as general manager of the Nathan Manufacturing Company, until his election as vice-president of the same company as above noted.

NEAR ZALISKY, OHIO, on December 31, an express train of the Baltimore & Ohio was derailed at a washout, the tender and eight cars going off. The train was moving at low speed and, according to reports, the injuries to the passengers were not serious.

# Railway Construction

CAMBRIA & INDIANA.—This company has applied to the Interstate Commerce Commission for a certificate authorizing construction of an extension from a point in Revloc, Pa., to Cambria, Pa., 5.08 miles.

CAIRO, TRUMAN & SOUTHERN.—This company has applied to the Interstate Commerce Commission for a certificate authorizing an extension from a point on the county line of Cross County, Ark., to a connection with the Missouri Pacific near Earle, Ark., 11 miles.

CHESAPEAKE & OHIO.—This company plans the construction of four miles of third track from Ashland, Ky., to Russell.

CHICAGO & NORTH WESTERN.—This company will begin next year the elevation of its tracks at Mayfair, Chicago, at a total cost of over \$1,000,000. The work planned for 1924 will cost \$600,000 and the project will be completed in the following year.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—This company is calling for bids for the construction of a freight station at Indianapolis, Ind.

DENVER & RIO GRANDE WESTERN.—This company will construct a subway under Main street in Grand Junction, Colo., the cost of which is to be divided equally between the city and the railroad.

Kansas City Southern.—This company has prepared plans for the construction of an addition to its general offices at Texarkana, Ark., to cost approximately \$40,000. The addition will be 50 ft. by 60 ft. and three stories in height.

KANSAS CITY SOUTHERN.—This company plans the construction of a grain elevator at Port Arthur, Tex., to cost \$500,000 with machinery.

LOUISVILLE & NASHVILLE.—This company will close bids on December 31 for the construction of a one-story machine shop, 110 ft. by 175 ft., at Etowah, Tenn., to cost approximately \$55,000, as reported in the *Railway Age* of June 9.

LOUISVILLE & NASHVILLE.—This company is reported to be planning the construction of a new passenger station at Hayden, Ala., and of improvements to the passenger station at Sheffield, Ala.

Southern.—This company has awarded a contract to the Dwight P. Robinson & Company, New York, for the design and construction of extensive additions to its shops at Birmingham, Alabama. The work includes locomotive repair shops, boiler and smith shop, car repair sheds, mill shop, power plant and other buildings.

SOUTHERN PACIFIC.—This company has awarded a contract to C. A. Fellows, Los Angeles, Cal., for the construction of a one-story locomotive erecting shop, 85 ft. by 498 ft., at Los Angeles, Cal., reported in the *Railway Age* of September 1.

SOUTHERN PACIFIC.—This company has awarded a contract to the Utah Construction Company, San Francisco, Cal., for the construction of three units of second track in the Sierra Nevada Mountains between Truckee, Cal., and Summit, reported in the Railway Age of November 10, page 851.

Texas & Pacific.—This company, reported in the Railway Age of June 23, 1923, as having purchased land on which to construct an engine terminal at Dallas, Tex., has prepared plans for the construction of an engine shop building, a roundhouse, a car shop and power house. The terminal will be located at Belt Junction, Dallas, and is estimated to cost \$350,000.

UNION PACIFIC.—This company contemplates the construction of a cutoff from Fort Collins, Colo., to Laramie, Wyo., a distance of 65 miles, and is now making surveys of the proposed route. This company has already applied to the Interstate Commerce Commission for a certificate authorizing the extension of a branch line from Fort Collins to a point approximately 18 miles north, as reported in the Railway Age of December 8.

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# Railway Financial News

AMERICAN NIAGARA.—Authorized to Issue Stock.—This company has been authorized by the Interstate Commerce Commission to issue \$1,000,000 of common stock to be sold at not less than par and the proceeds used in connection with the construction of the railroad.

Chicago & North Western.—Asks Authority to Draw Down Bonds.—This company has applied to the Interstate Commerce Commission for authority for the authentication and delivery of \$1,150,000 of general mortgage bonds to reimburse the treasury for expenditures in retirement of bonds of subsidiaries and also \$2,000,000 to reimburse the treasury for expenditures for additions and betterments.

CHICAGO, MILWAUKEE & ST. PAUL.—Authorized to Issue Bonds.—The Interstate Commerce this company to issue, pledge and specific per cent bonds as collateral security for short term notes which it is proposed to use to carry out its program for additions and betterments for 1924 and to meet various maturities during that year amounting to \$3,912,500. It is estimated that the completion of additions and betterments now authorized will require \$2,556,684 and the 1924 construction program will require \$3,544,000.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—Authorized to Issue Stock.—This company has been authorized by the Interstate Commerce Commission to issue \$20,000,000 of refunding and improvement mortgage bonds to be sold at not less than 94.81 and the proceeds used to retire and refund certain bonds and to reimburse the treasury for expenditures.

DELAWARE, LACKAWANNA & WESTERN.—New Director.—Jackson E. Reynolds, president of the First National Bank of New York, has been elected a director, succeeding Frank Rysavy, who resigned. The election of Mr. Reynolds does not change the First National's representation on the board of directors.

MOBILE & Ohio.—Equipment Trust Certificates Authorized.— The Interstate Commerce Commission has authorized an issue of \$1,678,000 of equipment trust certificates to be sold at not less than 95½.

Monongahela.—Asks Authority to Issue Bonds.—The Interstate Commerce Commission has been asked to authorize an issue of \$2,650,000 of first and refunding mortgage bonds to be pledged with the director general of railroads as collateral for notes.

New Orleans, Texas & Mexico.—Asks Authority to Issue Stock.—This company has applied to the Interstate Commerce Commission for authority to issue \$1,500,000 of common stock to be distributed to the stockholders as stock dividend. It is proposed to cancel \$669,300 of 5 per cent income bonds.

NEW YORK CENTRAL.—Authorized to Issue Stock.—The Interstate Commerce Commission has authorized the proposed issue of \$31,510,620 of common stock to be sold at not less than par.

New YORK, ONTARIO & WESTERN.—Authorized to Lease Roads.—This company has been authorized by the Interstate Commerce Commission to acquire control by lease of the Utica, Clinton & Binghamton and the Rome & Clinton. These roads have been operated by the New York, Ontario & Western since 1886 under lease from the Delaware & Hudson which had expired.

READING COMPANY.—Authorized to Operate Subsidiaries and Issue Bonds.—The Interstate Commerce Commission has granted this company's application for a certificate authorizing its acquisition and operation of the lines of the Reading system heretofore owned and operated by the Philadelphia & Reading and other subsidiaries. Authority was also granted to issue \$63,084,666 of general and refunding mortgage 4½ per cent gold bonds or in the first instance an equal principal amount of scrip certificates exchangeable for such bonds or other scrip certificates and to issue the bonds or other scrip certificates in exchange.

SEABOARD AIR LINE.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to issue \$1,693,000 of first and consolidated mortgage gold bonds to be pledged with the Secretary of the Treasury as part security for a government loan.

SOUTHERN PACIFIC.—Authorized to Operate Line.—The Interstate Commerce Commission has authorized this company to operate the Richgrove spur extending west from Richgrove on its Fresno branch, 4 miles, in Tulare County, Calif.

St. Joseph & Grand Island.—Six Months Guaranty Certified.

The Interstate Commerce Commission has certified the amount of this company's guaranty for the six months' period following termination of federal control as \$536,867, of which \$121,867 was to be paid on the final certificate.

St. Louis, Rocky Mountain & Pacific.—Omits Common Dividend.—The directors have voted to omit the dividend on the common stock due at this time. The regular quarterly dividend of 1¼ per cent has been declared on the preferred, payable December 31 to stock of record December 20.

President J. Van Houven says that earnings of the company in 1923 have been far below normal, and the outlook for a return to normal conditions, while giving promise of improvement, makes it advisable to conserve the cash resources,

Texas & Pacific.—Asks Authority to Issue Securities.—This company and the Missouri Pacific have applied to the Interstate Commerce Commission for authority for a plan of readjustment by which the Texas & Pacific is to issue \$24,676,000 of 5 per cent non-cumulative preferred stock and \$4,440,583 of unsecured coupon serial notes and assume obligation in respect of approximately \$3,000,000 of equipment notes and certificates and deliver to the court bonds or obligations to comply with the order guaranteeing \$3,653,000 of notes of the Trans-Mississippi Terminal Company. Authority is also asked for the exchange by the Missouri Pacific of \$23,700,000 of second mortgage income bonds of the Texas & Pacific owned by it for \$23,703,000 of preferred stock. The road has been in the hands of receivers since 1916. The plan also provides for \$3,000,000 in cash and the funding of judgments into unsecured serial notes.

# Dividends Declared

Belt Railroad & Stock Yards, Inc.—Common, 3 per cent, quarterly; preferred, 1½ per cent, quarterly; both payable January 1 to holders of record December 22.

Central of Ceorgia,—Common, 2½ per cent, payable December 31 to holders of record December 15.

Delaware, Lackawanna & Western.—3 per cent, quarterly, payable January 21 to holders of record January 5.

Georgia Railroad & Banking.—3 per cent, quarterly, payable January 15 to holders of record January 1.

Lehigh & Hudson River.—4 per cent (regular), and 2 per cent (extra), payable December 29, 1923.

New London Northern.—234 per cent, quarterly, and 3/2 per cent (extra), payable January 2 to holders of record December 16.

Norfolk & Western.—Preferred, \$1.00, quarterly, payable February 19 to holders of record January 31.

holders of record January 31.

Pennsylvania Company.—3 per cent, semi-annually, payable December 31 to holders of record December 27.

Rome & Clinton.—23/4 per cent. payable January 1 to holders of record December 22.

St. Louis, Rocky Mountain & Pacific.—Preferred, 1¼ per cent, quarterly, payable December 31 to holders of record December 20.

#### Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out and received from the several roads the following amounts:

Georgia Railroad	\$150,000.00
Western Railway of Alabama	100,000,00
The state of the s	
Detroit, Bay City & Western Railroad Co	22,063.29
Mackinae Transportation Company	86,000.00
Atlanta & West Point Railroad Company paid Director General	440,000,00
New York, Susquehanna & Western Railroad Company paid	,
Director General	100,000.00
Augusta & Summerville Railroad Company paid Director General	
New Jersey & New York Railroad Company-amount due	
from railroad, Federal control period, off-set by amount due from	Government
to railroad, guaranty period.	

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# Railway Officers

#### Executive

A. H. Jones has been appointed assistant to the vice-president of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., a newly created position.

John D. Dickson has been appointed receiver of the Pittsburg, Shawmut & Northern with headquarters at St. Marys, Pa., succeeding Henry S. Hastings, deceased.

#### Operating

J. L. Jamieson, superintendent of the Edmonton division of the Canadian Pacific, with headquarters at Edmonton, Alberta, has been transferred to the Lethbridge division, with headquarters at Lethbridge, Alberta, succeeding C. D. Mackintosh, who has been transferred to the Edmonton division.

H. F. Reddig, superintendent of the Missouri division of the Chicago, Rock Island & Pacific with headquarters at Trenton, Mo., has been promoted to assistant to the general manager of the First district with headquarters at Des Moines, Iowa, succeeding C. E. Green, who has been appointed superintendent of the Missouri division.

W. E. Smith, superintendent of the South & North Alabama, the Birmingham Mineral & Alabama and the Mineral divisions of the Louisville & Nashville, with headquarters at Birmingham, Ala., has been promoted to assistant general manager, with headquarters at Louisville, Ky., succeeding T. E. Brooks, whose promotion to general manager was reported in the Railway Age of December 15.

J. A. Morrison, superintendent of the Kentucky division of the Louisville & Nashville, with headquarters at Paris, Ky., has been transferred to the South & North Alabama, the Birmingham, Mineral & Atlanta and the Mineral divisions, with headquarters at Birmingham, Ala., succeeding W. E. Smith, promoted to assistant general manager. J. G. Metcalfe, assistant superintendent of the Kentucky division, with headquarters at Paris, has been promoted to superintendent, with the same headquarters.

J. A. Moran, whose promotion to division superintendent of the St. Louis-San Francisco, with headquarters at Chaffee, Mo., was reported in the Railway Age of December 15, was born on March 5, 1890, at Springfield, Mo. He entered railway service in September, 1907, as a telegraph operator and in March, 1908, was promoted to cashier and operator. Mr. Moran was promoted to station agent in September, 1909, and he held this position until December, 1913, when he was promoted to assistant division superintendent. He continued in this capacity until his recent promotion to division superintendent.

A. E. Walker, superintendent of the Arkansas-Louisiana division of the Chicago, Rock Island & Pacific, with head-quarters at Little Rock, Ark., has been transferred to the Kansas division, with headquarters at Herington, Kans., succeeding C. B. Pratt, who has been transferred to the Oklahoma-Southern division, with headquarters at Fort Worth, Tex. J. A. McDougall, superintendent of the Oklahoma-Southern division, has been transferred to the Arkansas-Louisiana division, succeeding Mr. Walker. J. J. Brehany has been appointed supervisor of operation, with headquarters at Chicago, a newly created position.

#### Mechanical

R. D. Smith, superintendent of motive power and rolling stock of the Boston & Albany with headquarters at Boston, Mass., retired from active service at his own request. F. A. Butler, division master mechanic with headquarters at West Springfield, Mass., has been appointed superintendent of motive power and rolling stock with headquarters at Boston, succeeding Mr. Smith. Samuel Russell, road foreman of en-

gines with headquarters at Rensselaer, N. Y., has been appointed division master mechanic with headquarters at West Springfield, succeeding Mr. Butler.

# Engineering, Maintenance of Way and Signaling

W. P. Wiltsee, acting chief engineer of the Norfolk & Western, with headquarters at Roanoke, Va., has been appointed chief engineer, with the same headquarters. F. P. Turner, acting principal assistant engineer, with headquarters at Roanoke, has been appointed principal assistant engineer, and L. L. Kelly, acting bridge engineer, has been appointed bridge engineer.

# Obituary

Dr. James A. Quinn, formerly general surgeon of the Great Northern and advisory surgeon of the Northern Pacific, died at St. Paul, Minn., on December 26.

George C. Jones, general manager of the Canadian National telegraphs with headquarters at Toronto, Ont., died at the National Club, Toronto, on December 31.

W. C. Jett, trainmaster of the Arkansas-Louisiana division of the Chicago, Rock Island & Pacific with headquarters at El Dorado, Ark., died in that city on December 18.

James Finley, formerly bridge engineer on the Canadian Pacific during its western construction period, who also had charge of the construction of the Canadian Pacific bridge at Lachine, Que., died at Vancouver, B. C., on December 24.

H. H. Johntz, engineer maintenance of way of the Missouri-Kansas-Texas, whose death on December 20 was reported in the Railway Age of December 29, was born on December 22, 1885, at Abilene, Kans. He graduated from the University of Kansas and entered railway service in 1910 as a draftsman on the Missouri, Kansas & Texas. Mr. Johntz was subsequently promoted to office engineer and in February, 1922, to district engineer, with headquarters at Parsons, Kans. He was later promoted to engineer maintenance of way, with headquarters at Dallas, Texas, and he continued in this position until his death.

E. K. Barrett, superintendent of bridges and buildings and water supply of the Florida East Coast, with headquarters at St. Augustine, Fla., died in that city recently. Mr. Barrett was born on September 6, 1869, at Orange, N. J., and entered railway service in 1885 as a rodman on the Jacksonville & Atlantic. He was later appointed transitman and levelman and in 1895 he was appointed resident engineer on the Florida East Coast. In 1896 Mr. Barrett left railroad service to engage in other engineering work but returned to the Florida East Coast in 1902 as general foreman and inspector. In 1906 he was promoted to supervisor of bridges and buildings and was subsequently promoted to superintendent of bridges and buildings and water supply, the position he held at the time of his death.

Henry S. Hastings, receiver of the Pittsburg, Shawmut & Northern with headquarters at St. Marys, Pa., died suddenly on December 13 at New Haven, Conn. Mr. Hastings was born on February 18, 1865, at Wellsboro, Pa., and entered railway service in 1884 as a clerk in the auditor's office of the Lackawanna & Pittsburgh (now Pittsburg, Shawmut & Northern). In 1890 he was appointed agent of the Interior Construction & Improvement Company in the construction of the Allegheny & Kinsua. Two years later he was appointed auditor and general agent of the Central New York & Western (now Pittsburg, Shawmut & Northern). In 1899 he went to St. Marys and in addition to being auditor and assistant treasurer of the Central New York & Western, he filled the same positions with the Buffalo, St. Marys & Southwestern, the latter road also became part of the Shawmut system. From August, 1899, to 1920, he was successively auditor and assistant treasurer and auditor and controller of the Pittsburg, Shawmut & Northern. On November 6, 1920, he was appointed receiver of that road and related properties, which position he was holding at the time of his death.